
SMITHSONIAN INSTITUTION LIBRARIES


SMITHSONIAN INSTITUTION LIBRARIES

TL
251
E552
N45h
V 14
No 14-
april-june, 1918

THE AEROPLANE

Edited by C. Gardner

WEDNESDAY, APRIL 3 1918.

Vol. XIV. No. 14 THREEPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

THE NORMAN THOMPSON FLIGHT CO. Ltd.

ESTABLISHED 1909

Telegrams—SOARING, BOGNOR
ENTIFLYTE CHARLES, LONDON

Works—MIDDLETON, BOGNOR

CONTRACTORS TO THE ADMIRALTY

Telephones—BOGNOR 48. GERRARD 7385

London Office—
DEWAR HOUSE, 11, HAYMARKET, S.W.1.

DESIGNERS AND MANUFACTURERS OF FLYING BOATS AND LAND PLANES

Auster FOR **Aero-shields**

LONDON. BIRMINGHAM



BEARDMORE AERO ENGINES

TITANINE

NON-POISONOUS

DOPE

SEE ADVERT: INSIDE.

TELEPHONE:- OLDBURY 111. **ACCLES & POLLOCK, LIMITED.** TELEGRAMS:- ACCLES OLDBURY

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

TRIPLEX Safety GLASS

See Advt inside

. THE .

ENGINEERING TIMBER CO. Ltd.

11, Victoria Street, London, S.W.

J. E. HUSON, Managing Director.

Telephone: Victoria—5073, 4210
Telegrams: Entikosil, Vic. London.

SILVER SPRUCE

ASH

WEST VIRGINIAN SPRUCE

WALNUT

MAHOGANY

GLASGOW:

67, HOPE STREET.

Telephone: Central 3273.

Telegraphic Address: Entikosil, Glasgow.

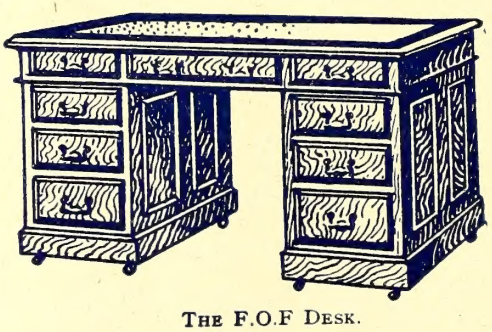
PARIS AGENCY:

6, RUE DE HAVRE, PARIS.

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK.

SAFES.

COOKE'S (FINSBURY) LTD.

FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

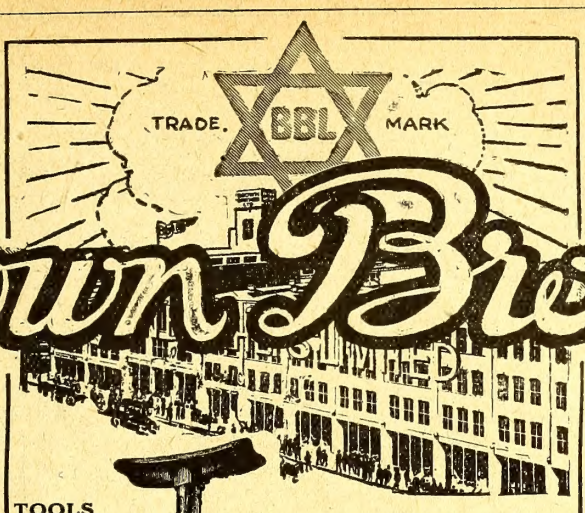
Telephones { LONDON WALL { 6179 573

See Telephone Book relating to our Shopfitting, Signs and other Departments

Browns Buildings
Great Eastern Street, London, E.C. 2.

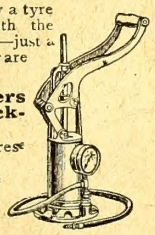
North of England Depot
DEANSGATE, MANCHESTER
and at Dublin, Paris & Melbourne

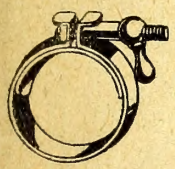
Brown Brothers LTD.



It is surprising how quickly a tyre can be fully inflated with the **Gleason-Peters "Pumps"**—just a few easy strokes of the lever are all that is necessary.

The Gleason-Peters Tyre Pump. "Quick-Service" Model.
Cylinder, 3¼ by 6½ ins. Pressure 125 lbs. Extreme height 23 ins. Diameter of base 6 ins.



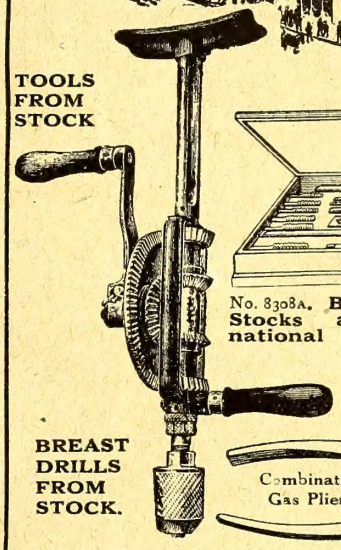


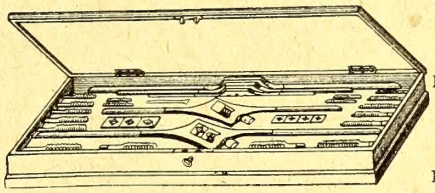
BRASS HOSE CLIPS for Water Connections. All sizes from stock.



"DUCO" HAND CLEANER.
Completely removes the most obstinate stains in an instant. Antiseptic and beneficial to the skin. May be used with hard, soft, hot, cold, or salt water. If your hands are covered with heavy black grease, or chemical stains, rub in a little "DUCO" and in less than a minute your hands are soft and white ... **7d. Per Tin**

TOOLS FROM STOCK

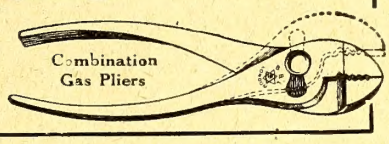


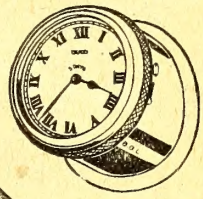


No. 8308A. **Best Quality English Stocks and Dies, International Standard Metric Thread, 8 sizes.**

No. 8308C. Ditto, **16 Sizes.**

BREAST DRILLS FROM STOCK.





The "DUCO" EIGHT-DAY CLOCK. Superior workmanship and finish, rain and dust proof, and an excellent timekeeper.
No. W2/2 Brass and Plated.

INSULATING TAPE. Good Quality. ¾ in. wide. No. W11/5.





"CLOVER" VALVE GRINDING COMPOUND.
Grinds quicker and better than emery, and is always ready for use with the administration of oil and water.
Sold in 4oz. duplex can (containing two grades—"C" for roughing and "A" for finishing) **1/1**

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.
60-66, ROCHESTER ROW, LONDON, S.W.1.
Telephone: Vic. 7570 (3 lines).

Managing Directors:
E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

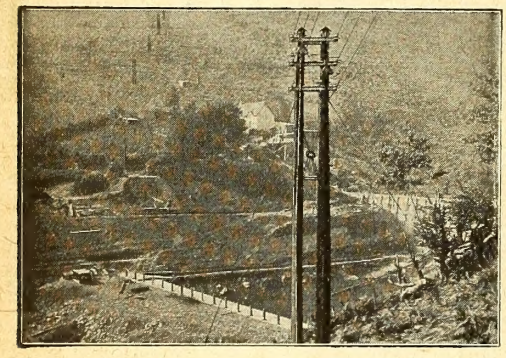
GOVERNMENT CONTROLLED ESTABLISHMENT.
UNDER THE MUNITIONS OF WAR ACT.

ADAM, GRIMALDI & Co, LTD.

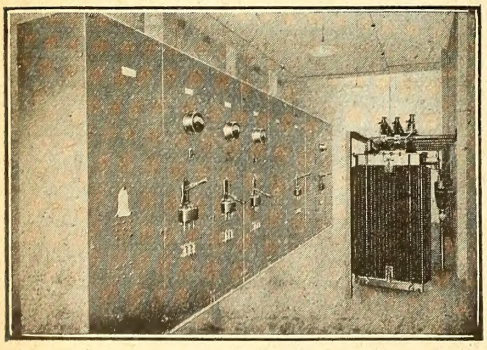
AIRCRAFT MANUFACTURERS
CONTRACTORS TO H.M. GOVERNMENT

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

ALBERT WORKS, GLASSHOUSE STREET,
ALBERT EMBANKMENT, VAUXHALL, S.E. 11
Telegrams: "Autocoach, 'Phone, London." Telephone: Hop 5552 e (3 lines)

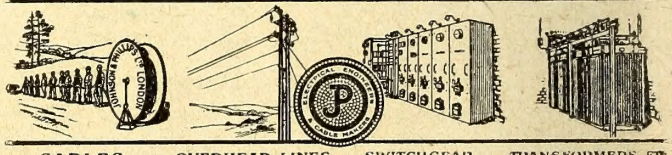


Electric Power Line.—Junction between Overhead and Underground Sections.



Switchgear and Transformers in Works Sub-Station.

SPECIALISTS IN ELECTRICAL TRANSMISSION AND DISTRIBUTION



CABLES OVERHEAD LINES SWITCHGEAR TRANSFORMERS etc

ELECTRIC POWER

Please send us your enquiries for any Cabling or Overhead Line Work, Switchgear, Transformers, Motors, Lamps or Wiring Accessories.

We are large Manufacturers of all such Plant and Material.

Complete Installations contracted for.

12, UNION COURT, OLD BROAD ST., LONDON, E.C. 2

Telegrams "JUNO" LONDON

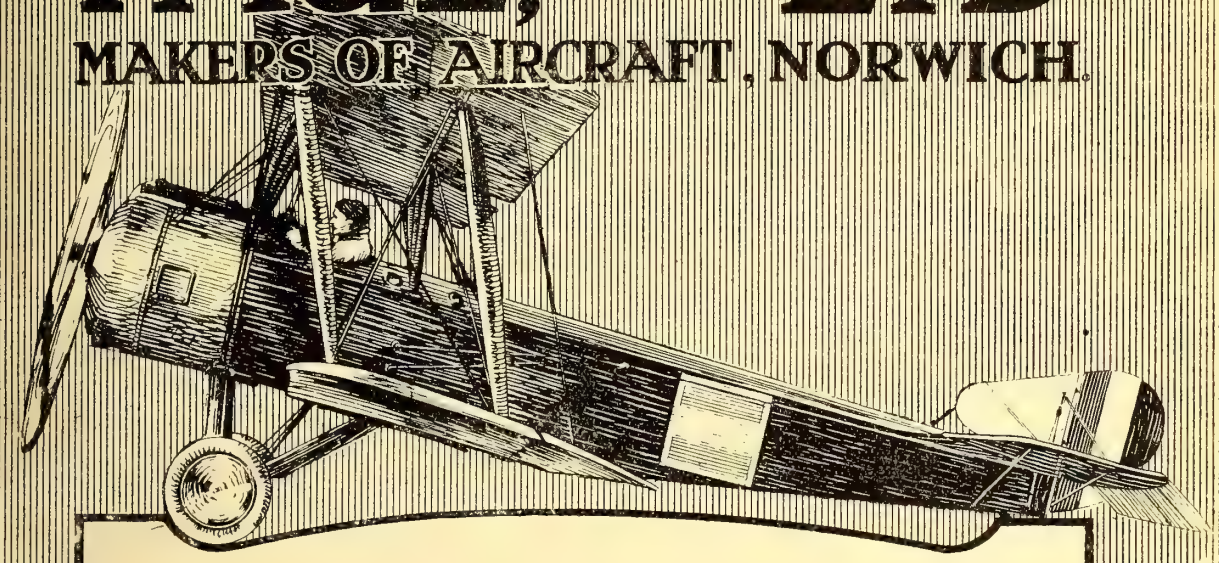
JOHNSON AND PHILLIPS LTD
ELECTRICAL ENGINEERS & CABLE MAKERS
CHARLTON, LONDON, S.E. 7.

Telephone 400

BIRMINGHAM 208, Corporation St. CARDIFF 9, Park Place. GLASGOW 159, W. George St. MANCHESTER 251, Deansgate NEWCASTLE-ON-TYNE 44b, Blackett St. PORTSMOUTH Cleveland Rd. Gosport

BOULTON & PAUL, LTD

MAKERS OF AIRCRAFT, NORWICH.



THE name of BOULTON & PAUL, Ltd., immediately suggests the highest possible standard of craftsmanship in metals and wood. So, when the need came, the firm was amongst the first chosen for this special work, and fully maintaining its reputation, is now amongst the largest contractors for Aircraft Construction.

BOULTON & PAUL LTD NORWICH

Telegrams "AVIATION, NORWICH."
Telephone: 851 NORWICH (5 lines)

FOUNDED 1797

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Works: Blackhorse Lane, Walthamstow.

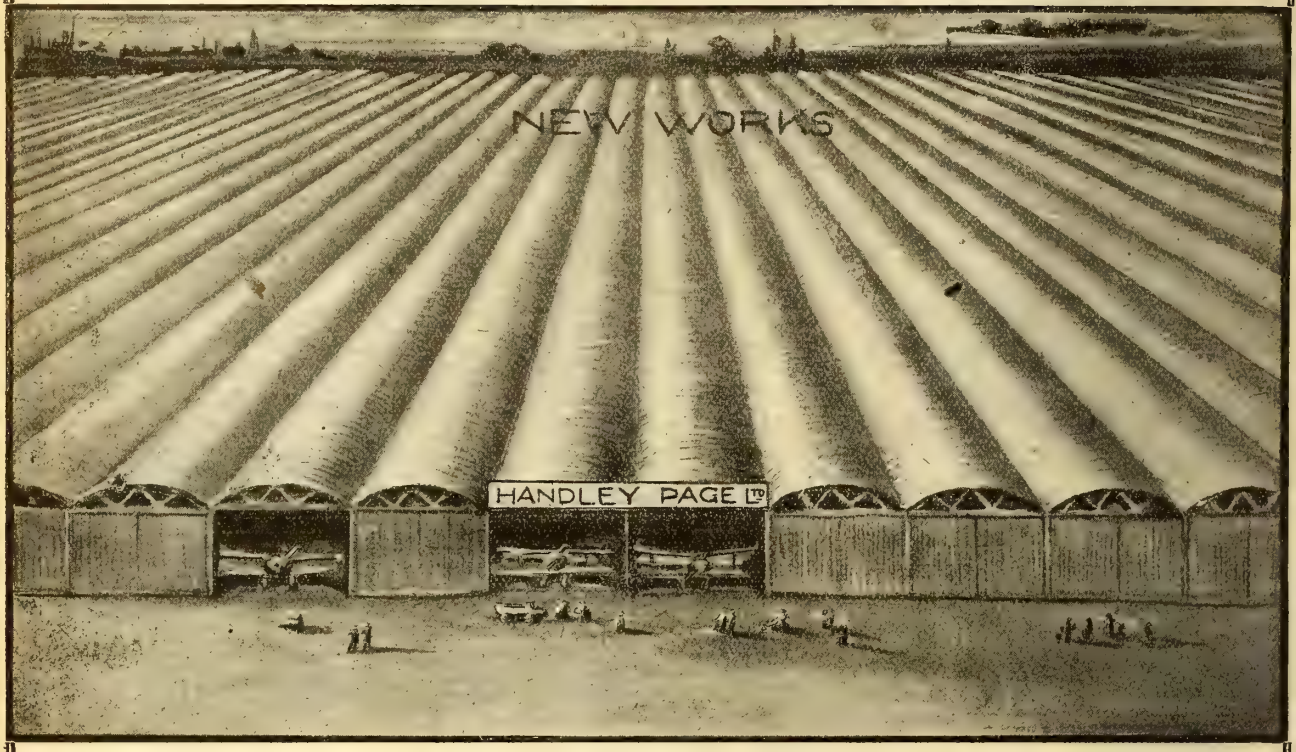
TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE-ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.

Handley Page Ltd



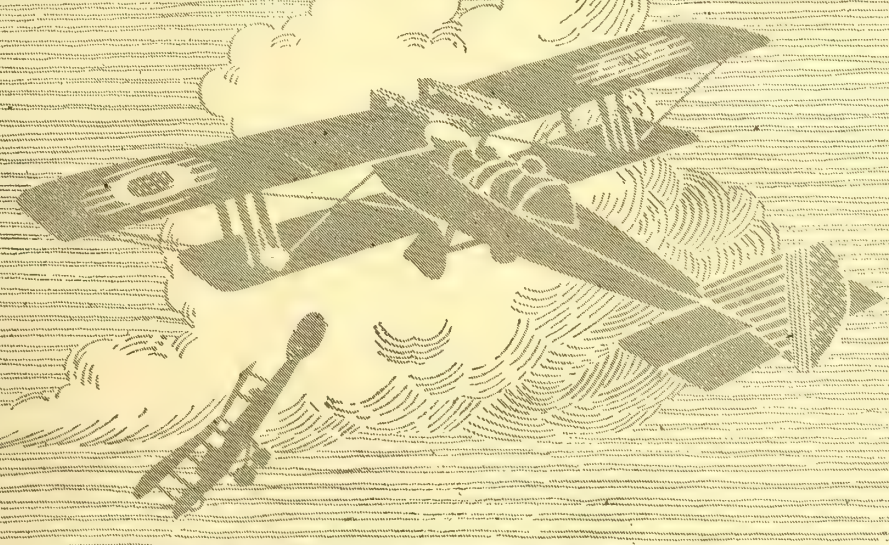
All communications should be sent,
All goods should be delivered
to
HANDLEY PAGE LTD.
CLAREMONT ROAD WORKS.
CRICKLEWOOD. N.W. 2.

Telegrams:
Hydrophid. Crickle.
LONDON

Telephone
Hampstead 7500
(10 lines)

Handley Page
CRICKLEWOOD Ltd LONDON. N.W.2

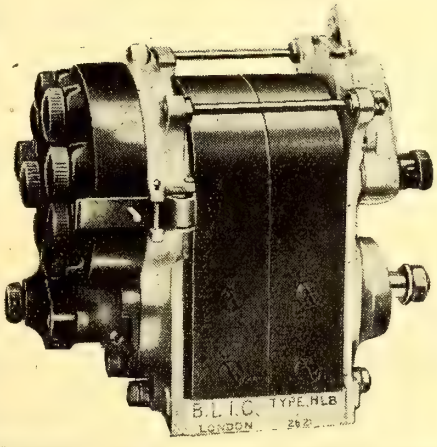
ASSOCIATION OF BRITISH MOTOR AND ALLIED MANUFACTURERS



THE HEART OF THE AEROPLANE—the vital centre of its power unit—is undoubtedly the magneto. Failure there must be unthinkable! That is why the "B.L.I.C." Magneto is supreme—its absolute reliability may be taken for granted!

B·L·I·C

THE BRITISH LIGHTING & IGNITION Co. Ltd.



THE BRITISH LIGHTING AND IGNITION Co., Ltd.

204, Tottenham Court Road, London, W.1.
Proprietors: VICKERS Ltd.

A. V. ROE & Co., Ltd.

Aeroplane Constructors.

NEWTON HEATH
MANCHESTER.

Telephones—
City 8530 and 8531.

Telegrams—Triplane.



AEROPLANES

AND

PARTS.



HAMBLE,
near SOUTHAMPTON.

Telephone—
Hamble 18.

Telegrams—
Roe, Hamble.

166, PICCADILLY,
LONDON, W.1.

Telephone—
Gerrard 3186.

Telegrams—
Senalpirt, Phone.

CODE: A.B.C.: 5th Edition.

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 8s. 10d. 6 months, 7s. 7d.; 12 months. 15s. 2d.
Foreign, 3 months, 5s. 0d; 6 months, 10s. 0d.; 12 months, 20s. 0d. Canada, 1 Year, $4.70c.
U.S.A., 1 Year, $5.20c.

ON LORD ROTHERMERE'S TASK.

Rumour, as persistent as ever, insists that Lord Rothermere intends to resign his office as Air Minister. It is earnestly to be hoped that he will do nothing of the kind, for it would be a difficult task to replace him, and, moreover, all the months which he has spent in his present position learning what he has to do would be wasted.

Those who have come in contact with Lord Rothermere are unanimous on two points, firstly that he is intensely in earnest about aviation, and secondly that he knows nothing about aviation. Both are virtues. The former gives promise of efficiency in the future. The second guarantees that he is free from the little knowledge which is such a dangerous thing for those who have to deal with a highly technical subject.

Lord Rothermere took Lord Cowdray's place just when Lord Cowdray was beginning, as an engineer, to know something about aircraft. Lord Rothermere came in as a business man with a great reputation as an organiser. Organisation was what the Flying Services needed, and still need. Lord Cowdray and Sir William Weir, despite their limited powers under the old Air Board scheme of 1917, had done wonders, as the present predominance of the R.F.C. in France clearly shows. Lord Rothermere, with the full powers of a Secretary of State, is in a position to do still more.

He began by having a wholesale clear-out of certain departments. On what advice he did the clearing-out is not known, but the fact that most of those who were cleared out of the Hotel Cecil by the front door promptly came in again by the back door suggests that his advisers were not as clever as they thought they were. At any rate the said back door has permitted several good men to go on working for their country.

Since then Lord Rothermere has learned much about the system and the people with whom he has to deal, and that, after all, is more important than learning technical details about the matériel of his Service. This is especially the case since he has two such able engineers as Sir William Weir and Sir Henry Fowler to look after the production side.

The Benefit of Impartiality.

The chiefest point in Lord Rothermere's favour is that he has no axe to grind. He is not a political adventurer seeking for either pay or power. Nor is he a Service politician looking for a post which might satisfy his ambitions. He has all the money he wants—thanks to his newspaper connections. So far as it is humanly possible to judge another man's motives, it seems that he is in his present position because he was put there on account of his reputation as a business organiser, and he is stopping there against his inclinations because he wants to do his duty by his country.

Even if Lord Rothermere were not the strong man and the great organiser which he is reputed to be, he would still be doing good by remaining as Air Minister, for at any rate he would make it impossible for men of dangerous ambitions, or for political busybodies, to get hold of his powers. If he did nothing except sit in his chair and let the Army run the Royal Air Force, he would still be serving his country better than most people are doing during the war.

If, as is to be hoped, Lord Rothermere retains his post for another six months or so, by which time he will have got a fairly good grip of the situation, we may expect really great effects from his organising ability. If in the meantime he does not act in any way, but merely spends his time in learning, he will do good.

Some Things for Attention.

During this period of education there are a few things to which he might direct his attention, because they require no technical knowledge, but merely common sense. For instance, last week the papers—anyhow the Harmsworth papers—were pervaded by a silly paragraph which chortled over the abolition of Staff tabs in the R.A.F., and eulogised the change as an indication of Lord Rothermere's determination to abolish red tape. "Red Tabs and Red Tape Abolished" was the alliterative heading of one paper.

Possibly one is growing old and fossilised, but one confesses to a respect for a moderate use of red tape. It is a neat, clean, and orderly commodity, which is used to produce similar qualities in the people on whom it is inflicted. As one has pointed out before in this paper, a roll of red tape, as a symbol of the methods employed by the War Office, is vastly preferable to the corresponding symbol for the Admiralty, a bunch of cotton waste.

Without material red tape chaos would ensue among official documents. Without moral red tape mental chaos is produced. Which accounts largely for the state of chaos at the Hotel Cecil, and also accounts for it and its ancillary groups of buildings being known among Service humorists as the Hotel Bolo, Bolshevik Mansions, Soviet Chambers, and Trotsky Rents, respectively. One of Lord Rothermere's tasks is to get everything neatly taped up, instead of merely exhausting himself in trying to push the mass along in front of him, as one very able official stated to be the only conceivable method of speeding up the working of the Air Ministry.

The Beauty of Tabs.

In much the same way Staff Tabs are not merely ornamental. They are of very great utility. If anyone wants a practical proof of the fact let them read that brilliant exposition entitled "The Great Tab Dope" by Colonel Swinton. Apart from being excruciatingly funny, it is a very sound piece of philosophy.

The Staff Officer must be distinguished from the ordinary executive officer if he is to do his work properly. It is the fashion to laugh at the Staff of the Army, but as a matter of fact the Army's Staff work for the last two years has been magnificent as a whole. Probably it is the finest in the world, not excepting that of the

German Army. If it went to pieces in the first year of the war, it was merely because, thanks to our pacifist politicians, we had only a few dozen trained Staff Officers to do the work for which as many hundreds were needed. It takes years to make a good regimental officer, and it takes a couple of years of special education to make a good regimental officer into a trained Staff Officer. And even then a special type of brain is required for Staff work. The finest fighter or leader of men may be a dire disaster on the Staff.

Owing to the nature of his work, it frequently happens that a junior Staff Officer, say a Staff Captain, has to issue orders to majors and colonels commanding units. In order to give him the necessary authority it is essential that he should wear some distinguishing badge. Does anyone imagine that a wing commander or a squadron commander R.A.F. would have any authority or would be able to obtain any attention to his opinions outside his own command if he wore no rank badges? Staff tabs are merely a mark of the authority which has been delegated to the wearer by the High Command, and they are as necessary as any other mark.

One strongly commends to Lord Rothermere the retention of Staff Tabs, not necessarily red, but nevertheless tabs. The æsthetic French grey of the R.F.C. Staff is excellent for the purpose. It suits the complexions of most of its wearers, and it is quite distinctive. Everybody in the Army knows what it means, so why not keep to it?

That Uniform.

Another little matter which demands attention which Lord Rothermere can give without incurring undue mental strain is the matter of that fearsome R.A.F. uniform. An apparently inspired article in the press on Saturday last, after remarking that "the fusion must obviously lead to increased efficiency"—which is neither obvious nor even probable—goes on to say that "with a view to putting an end to old jealousies and fostering a loyal *esprit de corps* in the new Force, the authorities emphasise the desirability of all members of it appearing in the new uniform as soon as possible."

Of course, being companions in misfortune does certainly promote *esprit de corps,* but there is no need to make the misfortune so great. It would have been just as easy to have lightened the misfortune by designing a decent uniform instead of letting a naval outfitter or a theatrical costumier loose on it.

The Horrible Hat.

First of all that horrible hat needs reforming. The naval cap in khaki is the ugliest headgear on earth. Why not go back to the Army hat?

Secondly, the glorified black bootlace round it makes it still worse. Why not have dark or light blue cloth, if there must be anything other than a khaki band?

Thirdly, the cap-badge is an atrocity. Why have all that gold lace stuff? It looks gaudy when new, and unutterably shabby when old. It cannot be cleaned or polished. It is needlessly expensive. And its design is too appalling for words. Why cram a bird and a crown and the two things below onto one badge?

Incidentally, what are those things underneath? They look, as one said recently, like the antennæ of a brass beetle. The pilots call them bananas. They might be a naval outfitter's attempt at palm branches of victory, or the olive branches of peace. Or perhaps they are an intelligent anticipation of General Salmond's historic despatch to Lord Rothermere, in which he said that our aviators had their tails well up, and so may express the exalted tails of horses.

How would one express that heraldically? Two horse-tails crossed rampant *or* on a field *sable*? A truly pretty conceit. If so, why not complete the jest and add underneath the motto already suggested, "*Sursum Cauda*"? Yes! One knew before it was first written that it was shocking bad Latin, but Heraldry is full of bad Latinity, especially in punning mottoes. At any rate, it is a more cheerful motto than the somewhat lugubrious "*Per Ardua ad Astra.*"

And, anyhow, why have all that clutter of bullion on the front of the cap when it could all be got into one neat metal badge like that of any of the distinguished regiments in the King's Army?

After that, why have wound-stripes on the cap by way of rank badges? Why not small stars? And if rank marks must be carried on the cap, why have two for a captain, when every soldier in the Army only knows of three stars as indicating that rank? After all, the Army is the predominant factor in these days, so it is necessary to the dignity of the Air Force that the Army should recognise its ranks. Yet the great brains who perpetrated this atrocity of a uniform seem to have gone out of their way to make such recognition difficult.

The final touch about the cap is in making a mere squadron commander, a major, into a full-blown "brass-hat" by loading his peak with gold leaves. The one thing both Navy and Army know is that a brass-hat denotes exalted rank, so it is ridiculous to make a major who is not even on the Staff into the equivalent of a colonel in the Army or a commander in the Navy. Also all this gold decoration adds to the major's expense of living if he believes in looking smart, and makes him look shabby if he is inclined to be careless.

The Jacket.

The rank badges on the jacket are equally badly designed. For the sake of officers serving on board ship it may be well to preserve the two Navy stripes, but they tell the soldier nothing about the wearer's rank, although the majority of the R.A.F. will always be serving with the Army. So why not keep the stars on cuff or shoulder-strap? If the stars would be too much like the Army, then why not use small worsted or silk wings, corresponding in number to Army rank: two for a lieutenant and three for a captain? There is no need whatever for the brass bird and crown above the stripes. They will be constantly torn off, and when they stop on the cuff they will wear out the linings of overcoats.

Finally, what about the belt? It is rumoured that officers will be allowed to wear a leather belt instead of the useless and ugly cloth contraption with its big brass buckle, which is at present regulation. If so, why not stick to the cross-strap as well, and so make the Sam Browne regulation wear? It is the one thing which distinguishes an officer at first glance in these days. Its absence makes it difficult to recognise the status of some of the R.A.F. Generals even. The Americans and French have taken to it. The R.N.A.S. on foreign service, and the R.N. Division, wear it. So why refuse it to the Air Force?

The costumier who designed the whole R.A.F. outfit has succeeded in making it gaudy without being neat, so it will be wise to nip this gaudy flower in the bud, and make a workmanlike job of it. These are just a few of the little things to which Lord Rothermere might give his attention in his spare time while he is learning more about the bigger questions of organisation.

The R.A.F. is going to be a very fine show when it settles down to its work. It was a mistake to make the change in the middle, or perhaps one should say at the beginning, of the war. It was a bigger mistake to remove competition, and thus substitute internal intrigue in one Force for healthy rivalry between two or even three Services. But this will be overcome in time. Therefore it will be just as well to settle such superficial but highly essential details as matters of uniform at the very start.—C. G. G.

THE KING AND THE R.F.C.

The King sent the following telegram to Sir Douglas Haig on March 27th :—

"I wish to express to General Salmond and all ranks of the Air Services of the British Empire in France my gratification at their splendid achievements during this great battle.

"I am proud to be their Colonel-in-Chief."

"George R.I."

The following Special Order of the Day, dated March 27th, has been issued :—

To His Majesty the King, Buckingham Palace, from Field-Marshal Sir Douglas Haig.

General Salmond and all ranks of the British Air Service in France desire to express their most loyal and heartfelt thanks for your Majesty's most gracious message. They are specially proud to think that they are rendering good service to their King and Empire at this critical period of the war, and the knowledge that they have won the appreciation of their Colonel-in-Chief inspires them to still greater efforts.

THE AIR MINISTRY AND THE R.F.C.

The following telegrams, which have been exchanged between the Air Ministry and General Salmond, G.H.Q., France, were published on March 27th :—

The Air Council congratulate you and all ranks of R.N.A.S., R.F.C., and Australian Flying Corps on the splendid work carried out during this great battle.

We are all following their great deeds, and know that they will keep it going.—Air Ministry.

* * *

Very many thanks for Air Council's congratulations, which are much appreciated by all concerned.

All ranks have their tails well up, and the superiority of British over enemy airmen has never been more marked.—General Salmond.

THE KING AND THE R.A.F.

On April 1st the Royal Naval Air Service and the Royal Flying Corps were merged under the new scheme into one body, the Royal Air Force. The King marked the occasion by sending the following telegram to Lord Rothermere at the Air Ministry in the Strand :—

"To-day the Royal Air Force, of which you are the Minister in charge, comes into existence as a third arm of the defences of the Empire. As General-in-Chief I congratulate you on its birth, and I trust that it may enjoy a vigorous and successful life.

"I am confident that the union of the Royal Naval Air Service and the Royal Flying Corps will preserve and foster that *esprit de corps* which these two separate forces have created by their splendid deeds.

"George R.I."

Lord Rothmere replied as follows :—

"Lord Rothermere, with his humble duty to your Majesty, begs leave on behalf of the Royal Air Force to convey an expression of their heartfelt appreciation of the gracious message addressed to them by their General-in-Chief.

"Lord Rothermere is confident that the assurance of your Majesty's interest and confidence will assist every officer and man in the Royal Air Force in the task of continuing the great traditions of the Royal Naval Air Service and the Royal Flying Corps—traditions which, as your Majesty has personally seen, have never been more gloriously maintained than in the struggle now proceeding."

THE KING AT THE FRONT.

The correspondent of the "Times," writing of the King's visit to France on March 28th-30th, says :—

Calls were made at the headquarters of the Royal Flying Corps and at several aerodromes. At one of these were men of Captain McCudden's squadron—Captain McCudden was not present—and the King was able to give them the first news of the bestowal of the Victoria Cross on their champion. The news was received with vociferous cheering.

UNIFORM FOR THE ROYAL AIR FORCE.

Air Force Memorandum No. 2.

1. The uniform for Officers, Warrant Officers, N.C.Os. and men of the Air Force has now been approved. Khaki will be worn as Service Dress for the period of the war, after which uniform of the same pattern, but of light blue cloth, will be substituted as early as possible.

The blue uniform may be worn by Officers during the war as Mess Kit. This is purely optional.

Uniform in khaki and blue may be seen in Room 751, 3rd Floor, North Block, Cecil Chambers, Air Ministry.

The new uniform will not be made compulsory until sufficient time has elapsed for existing uniforms of the R.N.A.S. and R.F.C. to be worn out, unless an allowance is made to Officers, when they will be expected to get khaki uniform as soon as possible. Further instructions on the latter point will be issued later.

Khaki Service Dress during the War.

Officers.

2. Cap and Cap Badge. The cap is the same pattern as that worn by the R.N.A.S. The crown is khaki and the peak and band are black. The badge is entwined laurel leaves, above which is a reduced facsimile of the metal bird at present worn on the sleeve by the R.N.A.S., the whole being surmounted by a Crown.

Rank is denoted as follows :—

Sec. Lts. and Lts.—One upright metal bar on each side of the badge.

Captains.—Two upright metal bars on each side.

Field Officers.—One row of gold oak leaves on the peak.

General Officers.—Two rows of gold oak leaves on the peak.

3. Jacket. The pattern is that of the Military tunic Service Dress modified as follows :—

(*a*) No shoulder straps.

(*b*) In lieu of Sam Browne belt a cloth belt is sewn on the back of the coat, which fastens in front with a bright buckle of gilt metal.

(*c*) The buttons are the R.N.A.S. type, *i.e.*, gilt metal with Bird surmounted by Crown.

Officers transferring from the R.N.A.S. and the R.F.C. will on supplying themselves with the Air Force Uniform, wear Rank distinction corresponding to that which they hold in their present service whether their present rank is permanent or temporary.

4. Badges of Rank. *Distinction Lace.* The badges of the Royal Navy in khaki braid will be used, with a Bird surmounted by a Crown, both in gilded metal, in lieu of the executive curl.

Rank is denoted as follows :—

Sec. Lt.—No lace, but Bird and Crown on both sleeves where lace would otherwise be.

Lt.—One row of distinction lace surmounted by Bird and Crown.

Capt.—Two rows of distinction lace surmounted by Bird and Crown.

Maj.—Two-and-half rows of distinction lace surmounted by Bird and Crown.

Lt.-Col.—Three rows of distinction lace surmounted by Bird and Crown.

Col.—Four rows of distinction lace surmounted by Bird and Crown.

Brig.-Gen.—One broad row of 2¼ in. lace surmounted by Bird and Crown.

Maj.-Gen.—One broad row and one ordinary row of distinction lace surmounted by Bird and Crown.

Lieut.-Gen.—One broad and two ordinary rows of distinction lace surmounted by Bird and Crown.

General.—One broad row and three ordinary rows of distinction lace surmounted by Bird and Crown.

5. Trousers and Breeches. As now worn by the R.F.C.

6. Shirts and Collars. Khaki shirts and collars with black ties.

7. Footgear.

With breeches—brown field boots or brown boots with puttees or gaiters, or brown stockings with shoes for aerodrome and similar wear.

With trousers—brown boots or shoes with brown socks.

8. Greatcoat. The usual military type British warm for mounted services. Badges of rank will be indicated on the shoulder strap in the same way as on the jacket, by distinction lace surmounted by Bird and Crown.

9. Distinguishing Marks. *For Pilots.*—The "Wings" of the R.F.C. on the left breast, with the substitution of the letters "R.A.F." for "R.F.C."

For Observers.—The "Half-Wing" with the letter "O" as at present worn by observers in the R.F.C.

For Medical Officers.—The badge of Caduceus of Mercury on the lapels of the Jacket. The Cap will be the ordinary cap of the Air Force Officer.

10. Blue Uniform used as Mess Kit.—The blue uniform is the same pattern as the khaki uniform, except that gold braid is worn instead of khaki braid.

White shirts and collars and black ties will be worn, and black boots or shoes.

Warrant Officers 1st Class.

11. Cap and Cap Badge. *The Cap and Cap Badge* will be the same as for Officers but with no bars on each side of the badge.

Uniform (including greatcoat) will be of the same pattern as for Officers, but the cloth will be of the texture issued by the R.A.C.D.

Rank will be denoted by a Bird surmounted by a Crown, both in gilt metal, and worn on both sleeves close to the shoulder.

Warrant Officers 2nd Class, N.C.Os. and Men.

12. Cap and Badge. The same pattern as at present issued to Petty Officers in the R.N. but with khaki Crown and black peak A Bird is substituted for the Anchor on the R.N. badge. Warrant Officers 2nd Class and N.C.Os. will wear a gold embroidered badge, and men a worsted embroidered badge.

13. Jacket. The same pattern as Officers except as follows:—
High all round collar.
Buttons of bronze colour instead of gilt.

Warrant Officers 2nd Class, N.C.Os. and Men will wear the Bird in red silk on both sleeves near the shoulders where the letters R.F.C. are worn at present by the rank and file of the R.F.C. Wireless Mechanics will wear, in addition, the "Hand and Thunderbolt" immediately under the Bird.

14. Badges of Rank. *Warrant Officers 2nd Class* (Quartermaster Sergeants). Crown on both sleeves below the elbow.

Flight Sergeants. 3 Chevrons and Crown.

Corporals and Sergeants. 2 and 3 Chevrons respectively.

1st Class Air Mechanics. 2 bladed propellers worn immediately under the Bird.

15. Footgear. Brown boots will be worn.

16. Leave and Parade Dress. Breeches, puttees and boots. Trousers will be worn as ordered.

17. Greatcoat. The usual military type British warm for mounted services.—The red silk Bird and badges of rank will be worn as on the jacket.

R.A.F. APPOINTMENTS, TRANSFERS, AND ATTACHMENTS.

Enquiries have reached this office recently respecting the position of men who joined the R.F.C. for "three years or the duration of the war," and who are now transferred to the R.A.F. for a period of four years. One enquirer asks what would happen to the "three years" men if the war stopped within the next six months or so, and wants to know whether they would have to serve the full four years in the R.A.F. on top of the two or three years already served in the R.F.C.

Apparently the official wording of Air Force Memorandum No. 1 is a trifle obscure in that this particular point is not specifically discussed. However, R.A.F. Headquarters kindly permit one to state, for the benefit of such anxious persons, that the Air Force takes over all existing contracts of this nature as they stand. That is to say, a "three years'" man is free to leave the Air Force whenever the Army is officially disbanded after the war.

There is no official pronouncement as to how long after the end of the war such disbandment will take place, but one can safely say that it will not be permissible for every air mechanic to "down tools" immediately peace is declared. A "state of war" will undoubtedly exist in theory for some time afterwards. Obviously the whole Navy, Army, and Air Force could not be let loose all at once to flood the country with their unemployed millions of men. Imagine what the Amalgamated Society of Engineers, for example, would have to say about such spoiling of the labour market. Disbandment must naturally take place gradually, and, one hopes, under conditions so organised that every man will walk out of the King's Service into respectable civilian employment.

In any case there is no cause for the "three years'" men to worry about the four years in the Air Force. They need have little fear of the war being over before they have completed both terms of service. But they may rest assured that if by any chance it does finish within the next four years they will be permitted to leave the Air Force just as soon as if they had remained in the Army.

Another species of enquiry comes from several youngsters who have been accepted as Probationary Flight Officers, R.N., and have not yet been ordered to report for duty. They appear to be anxious to know whether, when ordered to join the R.A.F., they will join as P.F.Os. at 14s. a day, or as R.A.F. Cadets at 1s. 6d. a day.

One gathers that those who have not already joined as P.F.Os. will now join as Cadets. The difference is slight. Instead of having to keep themselves out of 14s. a day, they will be housed, fed, and clothed, and will have 1s. 6d. a day for pocket money; which is probably quite as much as is good for them. If they prove suitable to hold the King's Commission they will be made commissioned officers. If not they may become N.C.O. pilots. If unsuitable as pilots they may become technical officers, or air mechanics, or they may be handed over to the Army. In any case they have no cause for complaint, for their future depends entirely on their own ability, and they may consider themselves very fortunate in having the opportunity of joining the Air Force.

Among those who have what looks like genuine cause for complaint are a number of Flight-Lieutenants R.N., some with two years' service or more, who come into the R.A.F. as lieutenants, though hitherto they have ranked with a captain in the Army. They make no complaint against the Army on account of their demotion, but that to which they do object is the taking in of all R.N.V.R. lieutenants as captains in the R.A.F.

It certainly seems hard that active service officers who have done good work, and who have not been promoted simply because the R.N.A.S. has not grown so quickly as the R.F.C., should come into the R.A.F. on a level with the latest confirmed P.F.O. or cadet, while R.N.V.R. two-stripers who have never even been to see the war walk in as full-blown captains, let alone the equally unwarlike two and a half stripers who blossom forth with brass hats as majors.

A curious omission from the Memorandum is any reference to R.N.V.R. sub-lieutenants. There are, one believes, a certain number of R.N.V.R. sub-lieuts. who joined and served as observers before the rank of observer-sub-lieut. was instituted. Those who continued as observers were, one believes, given the new rank, but there are others who, owing to wounds, injury, or illness contracted on active service, had to give up flying and have been employed on technical work of very considerable importance. Being merely R.N.V.R. Air Station officers, or abroad on active service, and not employed in London offices, some of them have probably been overlooked.

In the ordinary way one would expect such officers to come into the R.A.F. with some recognition of their past services and present responsibilities, but doubtless amid the scramble for recognition around Headquarters it was hard to see these quiet and distant servants of the King. Perhaps this note may recall their existence to those who have the handing out of promotions in the new force.—C. G. G.

THE ROYAL AIR FORCE.

(A Flying Officer's View.)

In one of the daily papers I have noticed an article on the new Royal Air Force, hoping that all officers will, as soon as possible, adopt the new uniform, and so put an end to any supposed friction that there may have been formerly between the two Services.

May I point out, from personal knowledge of many pilots and observers (and, after all, they are the only members of the Services, who, from a military point of view, are of value), that far more bad feeling is caused by the new letters R.A.F., than was ever present between the R.F.C. and R.N.A.S. as rivals.

In the words of a certain gentleman, the honour, glory, and prestige that both Services have gained in the past are to be merged into the letters R.A.F., letters which unfortunately, stand for all that has been bad and hampering to Military Aeronautics.

This choice may possibly have pleased certain technical, and, consequently, non-flying officers of the former R.F.C., but it cannot be regarded as anything less than a direct insult to all pilots, observers, and active fighting members of both Services, who, in the past, by their courage and devotion to duty, hampered as they were by inefficient and obsolete R.A.F. products, yet managed to maintain the prestige of the Flying Arm.

It is more than unfortunate that the amalgamation of the Services should have been carried out under this heading. A choice which, for lack of tact and understanding, could hardly have been exceeded, and which cannot fail to cause grave irritation.

Needless to say, few pilots or observers are going to stamp themselves voluntarily as R.A.F. products by adopting the new uniform until compelled to do so.

[One sympathises entirely with this officer's feelings, but the order has gone forth. The Brand of Cain, in the form of the letters R.A.F., cannot now be avoided. One can only advise officers and men of the R.A.F. to bear their brand in a proper Christian spirit, and to do their best to earn for the letters R.A.F., the same honour and respect which the R.F.C. badge has won.

The brand is perhaps a useful antidote to the fulsome flattery which has been oozing from all the pores of the officially inspired Press during the past week, in its endeavour to persuade the world that the R.N.A.S. and R.F.C. should be proud to sink their dearly bought honours in the common puddle which the name of the R.A.F. suggests.

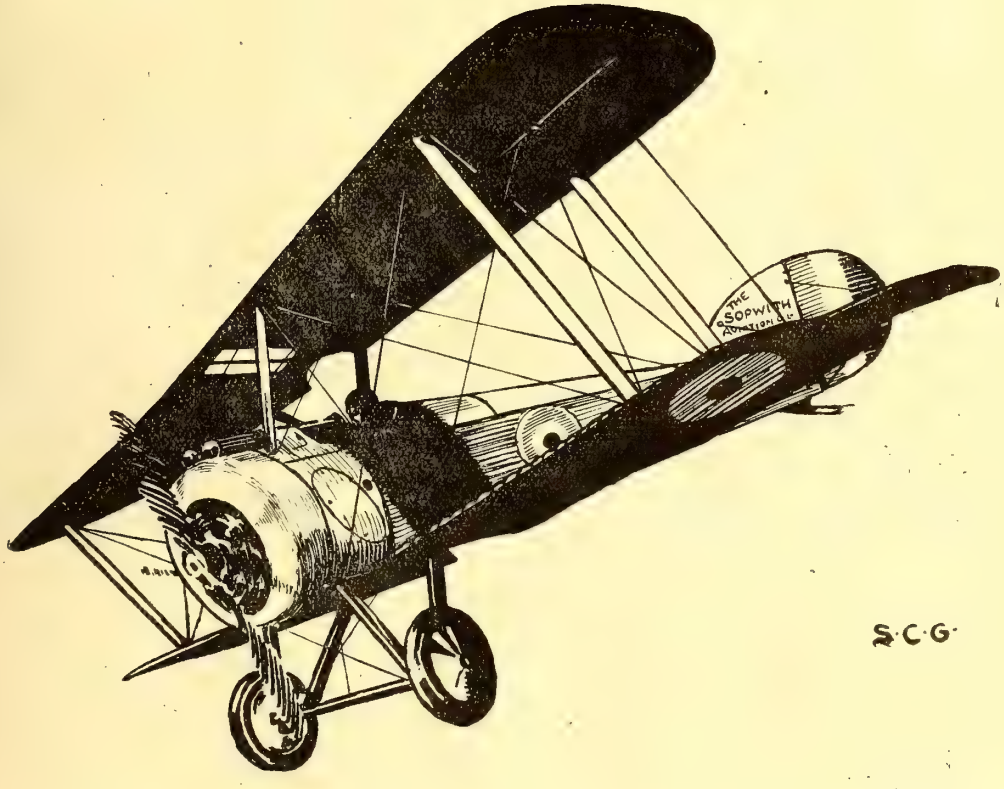
About the only person who can be congratulated on the new name is Lieut.-General Sir David Henderson, K.C.B., D.S.O., for it was due to his misplaced faith in the "experts" of the Royal Aircraft Factory that the R.A.F. products were allowed to hold back the output of improved designs and to waste labour and material which could have produced more and better aeroplanes for the R.F.C. He has now the pleasure of seeing the whole of our Flying Services branded with the name which stands for all that has been bad in Service Aeronautics. One hopes that he is satisfied.—C. G. G.]

"A PROTEST."

There are plenty of jobs in a pilot's life,
For his work is varied and never stale.
He guides the shells through the grumbling strife,
And follows the strafe in the gun-made gale.
On art-obs he streaks through the shell-swept lane,
Like a driven bird past the Ack! Ack! guns,
Until he wins to his own again
Breaking the cordon of gaudy Huns.
He is wakened again at any old hour
When the flares are lit neath the starry sky,
To worry and work to the best of his power
And in all he works, that the Hun may die.
But yet there are folk, who strike for more pay,
Or sit idle at home, not heeding the blood
That a gallant man will shed one day,
When some pilot fails in a "bus that is dud."

B.N.K.S.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

SBAC — Members of the Society of British Aircraft Constructors

Paris Office:
21, RUE DU MONT THABOR.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

THE AIR COUNCIL AND ITS FUNCTIONS.

(Continued.)

BY HENRY FORESTER.

The Advisory Committee.

The Advisory Committee on Aeronautics which for some years has occupied happily a nebulous position in the aeronautical world, recording with commendable fidelity the thought that had passed with "the snows of yester year," is to report to the Director-General of Aircraft Production, who will in turn either make use of such information as is available, or will communicate the views of the Committee to his colleagues on the Air Council.

The Air Inventions Committee, which in many ways has the duties of a permanent Commission on Lunacy, will also continue its sedative work under the direction and inspiration of the same Director-General. This Committee is somewhat confused in form, as it is a sub-committee of the Advisory Committee, and at the same time acts as a link between the Board of Inventions and Research and the Munitions Inventions Department. At least, so I read the not very clear definition given by Major Baird.

Land and Works.

The Administrator of Works and Buildings, who would appear to exist—from the appointments made to the Air Council in January—undertakes part of the duties in the maintenance and construction of Air Force buildings which would otherwise be done by the Controller-General of Equipment, and which in the Army is undertaken by the Master-General of the Ordnance.

Land in the case of the Army is under the charge of one of the civil branches of the Army Council. The Parliamentary Under Secretary of State for War has under him a Comptroller of Lands, who commandeers, buys, or hires such land as is required for the use of the King's Service.

In the Air Force these duties, which seem to be but little when stated in print, will be the province of a special Director of Lands. But with the Royal Air Force an infinitely greater extent of land must be taken over than is the case either in the Army or the Navy. The land on which barracks, stores, training depots, and so forth are erected will be much the same in total area, but in addition to all that there are the vast spaces that are required for aerodromes and landing grounds in all parts of the Empire.

The Under Secretary.

The Parliamentary Under Secretary for the Air Ministry undertakes the duty of representing the Ministry in the House of Commons when the President happens to be a Peer of the Realm. At all times, whether his chief is in the same House or not, he is put up to answer those insistent questions, on such matters as church-going in the R.A.F. or the contract price of castor-oil, which exasperate continually all Under Secretaries of State.

Departmentally he undertakes the control of the non-effective votes as once did the Under Secretary of State for War. Like him, also, it is possible that, should a Territorial Air Force come into existence at a later date, it will be under the direction of the Parliamentary Under Secretary of State for the Air Ministry.

Financial Duties.

But he also does similar duties to the Financial Secretary of the War Office. The Annual Estimates are drafted by him after consultation with the rest of the Air Council. Each item must be considered in its relation to the rest. No branch should be permitted to score at the expense of another branch momentarily less in the public eye.

He regulates the finances of the Air Force. All new proposals involving expenditure must be submitted to his department for approval. Similarly the creation of new appointments, new staff appointments, increased establishments, all pass through his hands.

The auditors of the Royal Air Force are under his direction, and he is technically responsible to Parliament for the proper expenditure of the money voted. The Pay Department is under him for administration.

Additional Members.

There are two additional members of the Air Council who can be appointed apparently without specific duties. One of them at the present time is Vice-President of the Council, and as the holder of the appointment is a soldier of long experience it is not unlikely that he will frequently preside over the Council in the discussion of military plans.

No specific duties are laid down for him in so far as can be judged from public statements, and it is not unlikely that he is unhampered by departmental duties deliberately in order that he may advise and assist wherever necessary.

The other additional membership of the Air Council is now held by a former editor of the "World's Work," which periodically described the manner in which other people worked, with pictorial representations of the workers. Perhaps this gentleman is appointed to the Air Council in order that he may in real life watch other people work and report on the manner in which he considers they do their duty.

The Secretary of the Air Council, unlike his prototype of the Navy, has no seat on the Council, and therefore it is unnecessary to describe his duties further than to say that he is responsible for the maintenance of the departmental personnel and that the central registry is under his direction.

Exact Allocation of Duties.

The exact allocation of duties to each member of the Air Council cannot be formulated with accuracy even by prescient members of the War Cabinet. Paper schemes can be produced by the dozen, each with more inherent charm than the last, but experience alone can define the exact boundaries of the work to be performed by each of those who form the Air Council.

No service can be conducted in water-tight compartments, and it is not possible to avoid considerable overlapping. If, however, there is general agreement as to policy, overlapping is an advantage rather than a drawback.

Dreams Which Go by Contraries.

From such declarations as have been made in public by responsible Ministers and from the Terms of an Army Order published towards the end of the past week it would appear that the Air Council can neither initiate nor conduct operations in the field nor on the high seas. Many of those who are responsible for the political agitation which has produced the Royal Air Services had visions of raids on an enormous scale carried out with brilliancy and efficiency over enemy lands under the direction of a vigorous President of the Air Council.

Their visions have so far followed those principles of the dream-book which ordain that when one dreams of a coffin one's immediate future is to be a revel of unrestrained joy. The War Cabinet have apparently decided that in the present infantile state of aeronautics it is as well that the existing land and sea forces should





MARTINSYDE

Aerodrome and Auxiliary Works:
BROOKLANDS.

Head Office & Works:
WOKING, Surrey.

direct all aerial operations in addition to their historic duties. In essence the Air Council is for the time being an administrative body whose main responsibility is the assisting of the Army and the Navy in the prosecution of the war.

Doubtful Cases.

There are many cases arising from time to time in which it is not clear whether certain aerial operations concern more closely the Navy or the Army. It is, for instance, necessary to bomb the Belgian coast and to patrol its shores day by day to check the activities of enemy aviators. Which Service is more closely affected by such work? The Navy may claim priority in that all shores border on seas and all seas belong to the British Navy since the days when Sir Francis Drake and Sir John Hawkins legalised piracy.

The Army, on the other hand, can insist equally that the shore is the border of the land, and that enemy squadrons flying in such places are more perilous to the forces in the field than to ships at sea. Each in truth have good reasons on its side.

To settle such questions and to delimit the respective spheres of operations there are weekly meetings between the Staff of the Air Force, the Staff of the Navy, and the General Staff of the Army. Cardinal disagreements at such meetings will no doubt be submitted to the War Cabinet for decision.

Recommendations of Operations.

The Air Council very properly has been given the power to recommend certain aerial operations, such as, for instance, the elimination of Essen by aerial bombardment, and can suggest to the War Cabinet which Service should conduct the entire movement. When once approval has been given, the Air Council must supply, equip, and maintain a contingent of proper size for the work to be undertaken. The Army and the Navy are relieved of all duties in regard to the Air Force, save the employment of Air Force units in the field.

The New Army Order.

The following Army Order was published on March 29th, and lays down the channels of communication and the relation between the Army and the Air Force :—

(I.) The Air Council has, as already notified, taken over the administration of all technical Air material, and all movements and postings of individuals of the Air Services.

(II.) It has now been decided that the Royal Air Force is to be brought into being as a unified force as from April 1st, 1918, from which date its administration will be vested in the Air Council.

(III.) From that date the procedure as between the Army and the Air Council, and between military commanders and Royal Air Force commanders as regards the allocation and command of bodies of the Royal Air Force, and as regards correspondence, will be as follows :—

(i.) The Army Council will indicate to the Air Council the number of squadrons of the various classes required for all military commands at home and abroad; where necessary they will inform the Air Council of any increases or decreases which they consider should be made.

(ii.) The Air Council will organise and equip these forces and hand them over as complete organisations to the military commanders. They will maintain them in personnel and equipment. Should the Air Council not be in a position to supply the complete requirements, to effect increases demanded, or to maintain air forces already provided, it will be for the Army Council to decide whether the deficiency can be met at the expense of contingents of the Royal Air Force operating under military commanders in other theatres.

(iii.) Serious deficiencies in personnel or equipment of Royal Air Force contingents, which are such as to affect materially the efficiency of the military force concerned, will be brought to the notice of the military commander by the Royal Air Force commander and communicated by the former to the Army Council.

(iv.) The military commander, who has under his orders a contingent of the Royal Air Force, will have the power to remove the commander of that contingent should he consider such action necessary, and may appoint temporarily a Royal Air Force officer to command from those available locally. The permanent replacement of the officer removed will be carried out by the Air Council after consultation with the Army Council.

(v.) Removal or transfer of subordinate Royal Air Force officers belonging to contingents under military commands will normally be carried out, without consultation with the Army Council, by the Air Council, who will issue their instructions direct to the local Royal Air Force commander.

Should the military commander be dissatisfied with a subordinate Royal Air Force officer acting under his orders, he will have power to direct the local Royal Air Force commander to suspend the subordinate officer of the Royal Air Force pending reference to the Air Council. In such cases the Air Council will consult the Army Council as to the action to be taken.

(vi.) Important alterations in the establishment or equipment of Air Force units allotted to military commanders, such as will affect the mobility or efficiency of the military force as a whole, will not be carried out without the concurrence of the Army Council.

(vii.) Alterations of approved establishment, suggested by the Royal Air Force commander for the improvement of the contingent under his command, will be submitted through the military commander concerned and by the latter to the Army Council.

(viii.) Recommendations for improved methods of co-operation or training with other arms will be submitted by military commanders to the Army Council, who will forward them with their recommendation to the Air Council.

(ix.) In general, communications on air subjects from military commanders, whether initiated by, or forwarded at the request of, Royal Air Force officers, or not, will continue to be addressed to the Army Council. The Army Council will inform the Air Council of the contents of these communications as may be necessary.

(x.) Reports and recommendations dealing with the technical training or equipment of Royal Air Force units will be submitted by Royal Air Force commanders direct to the Air Council, and instructions on these subjects will be issued by the Air Council direct to the Royal Air Force commander concerned.

(xi.) Reports on air operations of the Royal Air Force contingents allotted to military commanders will be forwarded by the Royal Air Force commander simultaneously to the military commander concerned and to the Chief of the Air Staff, Air Council.

Absolute Control.

The Army Order is self-explanatory. The Army Council is still in a position of absolute predominance in so far as concerns the employment of Royal Air Force units for military purposes.

Save in the matter of "Reports and recommendations dealing with the technical training or equipment of Royal Air Force units," which will be submitted direct to the Air Council, all communications pass to the Army Council for necessary action. The Army Council, of course, are expected to keep the Air Council informed not only of all that has happened, but of the methods intended to be used in future.

The terms of this Army Order remove the main cause of uneasiness from the minds of experienced soldiers. It was feared that the formation of the Air Council in the middle of the greatest war in history might, if that body had too much power, tend to disunion in operations, however unintentionally such divergence of effect might come about. It is now clear, however, that the military commander in the field is to remain supreme, and that in so far as the Army is concerned the aerial contingents will remain to all intents and purposes an arm of that Service.

District Commands.

If Royal Air Force districts were to be formed in England, the question arises whether they should be distinct from the great Army Commands or whether they should be territorially the same and should exist merely for the purpose of administering the Royal Air Force units stationed in the commands, these units being for operations and training under the respective military commanders concerned. The latter course would be simple and effective, and would ensure similarity of practice at home and abroad, in peace or in war. One can reasonably assume this to be the correct reading of paras. (i.) and (ii.) of the A.O.

Thus in the Scottish, Northern, Western, Southern, and Eastern Commands and London district and in Ireland there would be a Royal Air Force General Officer Commanding the R.A.F. units in the command. He and his contingent would be under the G.O.C. each Command

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

H.M. AIR FORCES.

Telegrams:
"AVIATION, BRISTOL."

Telephones:
3906 BRISTOL
(Private Branch Exchange)

for operations and training, and he would administer the contingent himself, with responsibility in this matter only to the Air Council, provided the necessary standard of efficiency were maintained.

Abroad in times of peace it is only natural to assume that a similar practice would obtain overseas in each of the great Commands and garrisons holding the uttermost posts of the Empire.

It is to be assumed that a similar order will be issued by the Lords Commissioners of the Admiralty in regard to the Air Force units selected for service with the Fleet and at Naval Stations.

ULTIMATE INDEPENDENCE.

At a later date, when the strategy and tactics of the air have developed to such a degree that they stand in such relationship to combat on land and sea as sea warfare does at present to land warfare, it may be that the Air Council will both initiate and direct campaigns in the air. It is hard for those of us who have been trained in conservative schools of thought to realise that an aerial force will ever operate independently in every way from the Army and the Navy.

It is possible to-day for the Army to carry through a campaign in which the Navy has no concern. Equally it is possible for the Navy to operate without aid from the Army. In the future it is said that the Third Service also may have a war entirely to itself without interference from the older Services.

When that time comes, the Air Council, if it still exists in even a shadow of its present form, will be able to justify its existence and take over from the Admiralty and War Office part of the great burden they have borne so long and so well. The Air Council has great opportunities, and it is fortunate in the possession of some officers endowed with military genius and inspired with enthusiasm in the work they have chosen.

At present the Air Council appears to fulfil merely functions somewhat similar to those pertaining to the Board of Ordnance prior to its reform in the middle of the nineteenth century.

THE "GOEBEN" AFFAIR.

The officially approved account of the "Goeben" affair is about the most painful reading to which anyone with any respect for the King's Navy could be subjected. The ship was, it seems, attacked from Jan. 20th to Jan. 29th inclusive. The number of flights made in attacking her was 276. The weight of bombs dropped was 15 tons 3 cwt. As the result of all that fuss, 16 direct hits are claimed on a big ship which was hard and fast aground. After which it seems that she went home from the Dardanelles to Constantinople under her own power. Such an amazing confession of incompetence on the part of the Admiralty has probably never been made public since that unfortunate and gallant officer, Admiral Byng, was shot on his own quarter-deck for failing to do the impossible, because of the Admiralty's sins of omission.

One is full of admiration for the gallant young aviators who made those 276 flights by day and by night, but what is one to think of the High Command which made such and so many flights necessary? As one pointed out at the time, one torpedo-carrying seaplane would have settled the "Goeben" for ever.

It is getting on for five years since Captain Sueter, R.N., began experiments with torpedoes from seaplanes at Ca
It is three years since one of our torpedo seaplanes sank a Turkish transport in the Marmora. It is over a year since a German torpedo seaplane attacked shipping in British waters. Yet here we have official evidence that when the chance came of sinking the one dangerous ship in the Eastern Mediterranean, the R.N.A.S. was not equipped to deal with it. Who is responsible for the omission, and who is to blame for these 276 unnecessary flights with their consequent waste of bombs and petrol, and wear and tear of men and machines? And will the culprit suffer in any way?

THE OFFICIAL ACCOUNT.

However, let the official account speak for itself and for the organisation of the R.N.A.S. :—

Details now available of the air operations carried out at the Dardanelles against the "Goeben" and "Breslau" show that as soon as news that the vessels were out had been received early on January 20th our air patrols were despatched. Twenty minutes later a message was received that Kusu and Kephalo were being shelled, and all the Greek pilots at an adjoining air station at once flew over to take part in the air operations. With the first clear light it was seen that H.M.S. "Raglan" had sunk at anchor and that monitor 28 was on fire amidships.

The "Goeben" and "Breslau" were then about five miles out to sea off Kusu and steering south. They were followed by our planes. Ten minutes later eight to ten machines were continuously harrying the enemy ships. This action of our aircraft was causing the "Breslau" to steer a zigzag course, which brought her into one of our minefields, where she struck a mine. Very shortly afterwards she was hit by an aircraft bomb and sank. Five Turkish destroyers endeavoured to reach the spot, but were driven off by two British destroyers.

Heading for the Dardanelles the "Goeben" struck one of our mines, and developed a list to port. Aircraft continued to bomb her while she entered the straits, and she ran aground at Nagara Burnu. Pilots who undertook a special reconnaissance reported that she looked as though aground, as she was slightly tilted up forward and a large amount of disturbed mud was seen around her. Sixty-five flights were made during the day, and a great many pilots and observers made two or three attacks on the enemy's ships.

At dawn on the following day a raid was made on the "Goeben" by five bombers. It began in semi-darkness and the Narrows were obscured by clouds, so that the ten heavy bombs were dropped during anti-aircraft fire in the estimated position of the "Goeben" and no observation could be made. At midday a bombing raid commenced in which fourteen machines took part, going up at intervals of ten minutes.

Shortly after 6 p.m. on the 21st nine machines made a night raid. Continuous anti-aircraft fire was directed on them from shore batteries and from the "Goeben." Six heavy bombs were dropped on the "Goeben" from heights of 2,500 ft. to 3,000 ft. While no claim to a direct hit can be made, one explosion took place in close proximity to the two searchlights of the "Goeben," which seemed to be the reason for their immediate extinction. All the machines returned safely. Fifty-one flights were made during the 24 hours, and two tons of bombs were dropped.

At 9 a.m. on the 22nd four machines made a successful raid. One made a direct hit amidships, and a volume of steam and smoke appeared directly afterwards from the ship. R.N.A.S. machines at 1.45 p. m. dropped eight bombs, which fell close to the "Goeben."

In a night raid three small seaplanes all dropped bombs on her. One of these pilots dropped his bombs on or near the ship from the height of 4,000 ft. On the return flight he landed midway between Lemnos and Imbros owing to engine trouble, and on his gliding to the surface six shots were fired at his machine, apparently by a submarine, when he was at a height of 600 ft. He was not molested, however, when on the water, and, although Vérey lights were fired from the seaplane and calcium flares dropped, he received no assistance during the night of the 22nd. At 5.30 a.m. on the 23rd a seaplane found and towed his machine to the mouth of Mudros Harbour, where she was brought in undamaged by a destroyer.

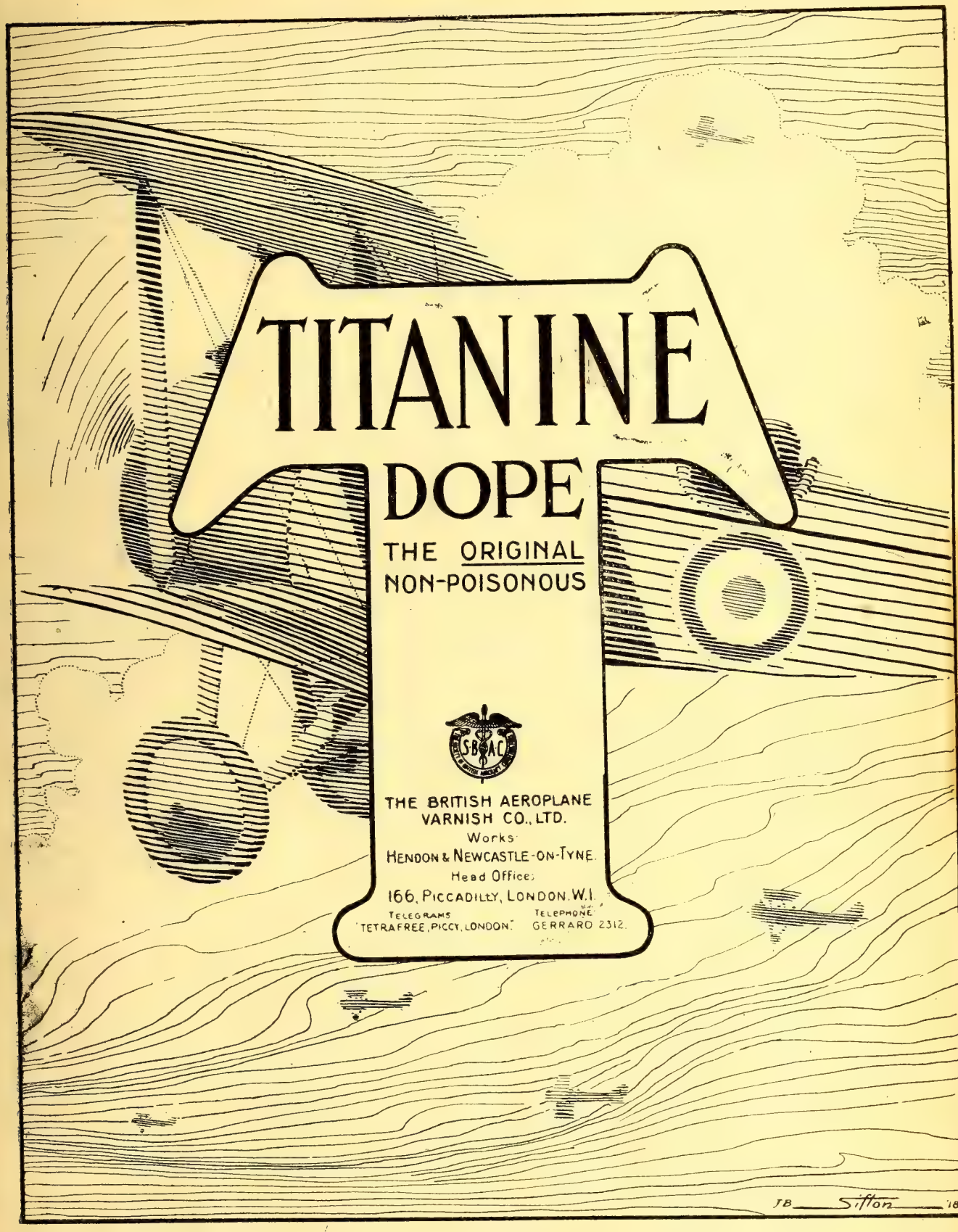
At midnight on the 22nd four direct hits were registered on the "Goeben," and from 8 a.m. that day to 8 p.m. on the 23rd 48 flights were made, bombs weighing 56½ cwt. being dropped. Forty-six flights were carried out in the next 24 hours, and 72 cwt. of bombs were dropped on the "Goeben," ships and boats round her, and on the Galata aerodrome. During the following 24 hours the flights numbered 34, and the bombs dropped weighed three tons.

Raids were continued until the 27th, but on January 28th seaplanes reported that the "Goeben" had disappeared, and that there was no wreckage floating around the spot where she had been. A reconnaissance of the Constantinople area to locate her was made on January 29th. The "Goeben" was seen lying near the inner of the two bridges spanning the Golden Horn by the arsenal, and stretching half-way along that bridge. The largest of the arsenal dry docks was seen to be flooded and open, and the smaller dry dock contained a ship which could not be identified.

During the attack, which lasted from January 20th to January 29th, 276 flights were made by our aircraft, and approximately 15 tons 3 cwt. of bombs were dropped, while at least 16 direct hits on the "Goeben" were recorded.

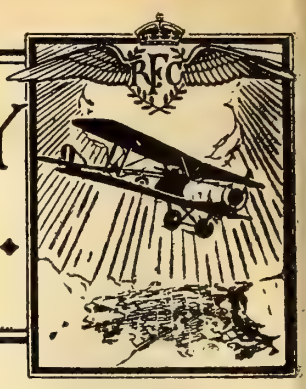
THE GENTLE TURK.

In a letter just received from Mesopotamia a Guildford man serving with the Queen's Royal West Surrey Regt., writes: "At the funeral of General Sir Stanley Maude a Turkish airman flew over the cortège and dropped a wreath 500 yards in front of the column. The machine then dipped twice, about-turned, and flew back to its nest. During the time it was over the city, and before its mission could be divined the machine was subjected to anti-aircraft fire, but fortunately it evaded the shells."


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
Works:
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON, W.1.
TELEGRAMS
"TETRAFREE, PICCY, LONDON."
TELEPHONE
GERRARD 2312.
JB Sifton 18



NAVAL and MILITARY · AERONAUTICS ·



FROM THE "LONDON GAZETTE."

War Office, March 26th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Staff Officer, 3rd Cl.—(Graded as a G.S.O., 3rd Gr., at the War Office).—Lt. (temp. Capt.) F. A. M. Rawes, R.F.A., Spec. Res., from an Adjt., and to retain his temp. rank while so empld., vice Lt. (temp. Capt.) H. A. Fordham, North'd Fus., March 3rd.

Flt. Comdrs.—Temp. Lt. J. G. Coombe, Gen. List, from a Flying Officer, and to be temp. Capt whilst so empld., Feb. 18th. Lt. (temp. Capt.) I. H. D. Henderson, M.C., Arg. and Suthd. Highrs., from a G.S.O., 3rd Gr., and to retain his temp. rank while so empld., with seny. from July 1st, 1916. Sec. Lt. (temp. Lt.) A. A. Denison, M.C., York. and Lanc. R., from a Flying Officer, to be secd., and to be temp. Capt. while so empld., March 1st.

Equip. Officers, 1st Cl.—Temp. Lt. H. L. Crichton, Gen. List, and to be temp. Capt. while so empld., Nov. 16th, 1917 (substituted for the notification in the "Gazette" of Dec. 7th, 1917).

Experimental Officer, 3rd Cl.—(graded as an Equipt. Officer, 3rd Cl.).—Sec. Lt. C. H. Shelton, R.A., and to be secd., Jan. 5th.

Schools of Instrn.—School of Technical Training.—Park Comdrs.—Maj. A. W. Colley, N. Lanc. R., Nov. 24th, 1917. Capt. Sir J. Eardley-Wilmot, Bt., Rif. Brig., Spec. Res., to be secd., and to be temp. Maj. while so empld., Dec. 6th, 1917.

Gen. List.—Cpl. A. S. Morgan, from R.F.C. (since killed in action), to be temp. Sec. Lt., April 22nd, 1917.

Lt. D. A. M. MacManus, R. Innis. Fus., to be temp. Capt. (without the pay or allowances of that rank), whilst acting as Adjt., vice Temp. Sec. Lt. (temp. Capt.) H. Waddington, Manch. R., who relinquishes his temp. rank, Feb. 20th.

* * *

The King has been pleased to confer the following rewards for gallantry and distinguished service in the field. The acts of gallantry for which the decorations have been awarded will be announced in the "London Gazette" as early as practicable:—

Distinguished Service Order.

Lt. (temp. Capt.) G. H. Bowman, M.C., R. War. R., Spec. Res. and R.F.C.
Capt. R. M. Drummond, M.C., R.F.C.

A Bar to the Military Cross

Capt. W. E. Molesworth, M.C., R. Muns. Fus., and R.F.C., M.C. gazetted Sept. 26th, 1917.
Temp. Capt. F. G. Saunders, M.C., R.F.C., M.C gazetted June 4th, 1917.
Lt. R. M. Smith, M.C., Aus. Light Horse R., attd. Aus. F.C., M.C. gazetted May 11th, 1917.

The Military Cross.

Temp. Lt. R. A. George, Gen. List and R.F.C.
Temp. Lt. G. E. Gibbs, R.F.C.
Temp. Capt. T. Gran, Gen. List and R.F.C.
Temp. Sec. Lt. R. W. Hobbs, S. Wales Bords., attd. R.F.C.
Sec. Lt. J. S. Jones, R.G.A., Spec. Res., attd. R.F.C.
Temp. Capt. R. K. Kirkman, Gen. List and R.F.C.
Lt. R. S. Larkin, R.F.C., Spec. Res.
Sec. Lt. (temp. Capt.) K. M. St. C. G. Leask, Devon R. and R.F.C.
Sec. Lt. G. E. H. McElroy, R.G.A. and R.F.C.
Temp. Capt. F. Nuttall, R.F.C.
Sec. Lt. T. L. Steele, Gen. List and R.F.C.
Temp. Capt. J. H. Tudhope, Gen. List and R.F.C.
Temp. Sec. Lt. A. B. Whiteside, Gen. List and R.F.C.
Temp. Capt. H. T. O. Windsor, Gen. List and R.F.C.
Capt. R. N. Wolton, R.F.A. and R.F.C.
Temp. Sec. Lt. A. J. Wright, Gen. List and R.F.C.

War Office, March 27th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Sqdn. Comdr.—Capt. T. F. Rutledge, M.C., Spec. Res., to revert from a Wing Comdr., to relinquish the rank of temp. Lt.-Col., and to be temp. Maj. while so empld. (March 8th, seny. from May 15th, 1916).

Flt. Comdrs.—From Flying Officers:—Capt. S. R. Penrose-Welsted, R. Ir. Regt. (Feb. 7th); Temp. Lt. W. H. Park, Gen. List, and to be temp. Capt. while so empld. (Feb. 26th); Capt. (Hon. Lt.) N. Deakin, Yeo., T.F. (March 2nd). And to be temp. Capts. while so empld.:—Temp. Sec. Lt. F. W. Wells, Gen. List. Temp. Sec. Lt. E. Waterlow, Gen. List. (March 8th).

War Office, March 28th.

REGULAR FORCES.—Staff.—Attached to Hd.-Qr. Units.—Brig. Comdr.—Bt.-Col. (temp. Maj.-Gen.) W. S. Brancker, R.A., and to retain his temp. rank whilst so empld., Oct. 19th, 1917.

Establishment.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.:—Sec. Lt. (temp. Lt.) L. D. Baker, R. Dub. Fus., Spec. Res., Feb. 8th. Temp. Sec. Lt. M. M. McLeod, Gen. List, March 10th

Gen. List.—Temp. Lt. (temp. Capt.) C. A. Bourne resigns his commn., Sept. 15th, 1917.

Memoranda.—The following are granted temp. rank while empld. in the Aeronautical Supplies Directorate, Ministry of Munitions, Sept. 28th, 1917:—As Brig.-Gen.—Bt. Lt.-Col. W. Alexander, D.S.O., R. Highrs., T.F.

As Lt.-Col., Maj. I. B. Davson, Yeo., T.F.; temp. Maj. A. E. J. Reiss, Gen. List; temp. Capt. R. H. Brand, Gen. List; Capt. G. W. Williamson, M.C., Manch. R., Spec. Res.

As Capt.:—Sec. Lt. (temp. Lt.) C. L. Hardy, R.F.C., Spec. Res.; Lt. D. M. Greig, Suff. R.; Sec. Lt. (temp. Lt.) F. A. Woolfe, R.F.C., Spec. Res.; temp. Lt. F. J. Musselwhite, Gen. List; Sec. Lt. (temp. Lt.) H. L. U. Clark, R.F.C., Spec. Res.; temp. Lt. D. Munro, attd. High. L.I.; temp. Lt. G. H. Creighton, R.F.C., Gen. List; Sec. Lt. J. H. Cotton, R.F.C., Spec. Res.; Sec. Lt. (temp. Lt.) S. Blackley, R.F.C., Spec. Res.; Sec. Lt. H. F. L. Dixon, R.F.C., Spec. Res.; Sec. Lt. S. A. Marples, R.G.A., Spec. Res.; Sec. Lt. (temp. Lt.) F. W. Elstub, R.F.C., Spec. Res.; Sec. Lt. (temp. Lt.) G. Dennison, R.F.C., Spec. Res.; Sec. Lt. W. Park, R.F.C., Spec. Res.; Sec. Lt. R. Waddell, R.F.C., Spec. Res.; Sec. Lt. A. W. Gillespie, R.F.C., Spec. Res.; temp. Lt. J. M. Macauley, Gen. List; Lt. C. H. Johnson, R.E., T.F.; Sec. Lt. (temp. Lt.) A. Burgess, R.F.C., Spec. Res.; Sec. Lt. (temp. Lt.) W. Sillem, R.F.C., Spec. Res.; Sec. Lt. W. E. Nuttall, R.F.C., Spec. Res.; Sec. Lt. R. H. Sperling, T.F. Res.; Sec. Lt. E. H. Wilding, R.F.C., Spec. Res.; Sec. Lt. W. C. Clark; Sec. Lt. (temp. Lt.) L. G. Fenner, R.F.C., Spec. Res.; Sec. Lt. (temp. Lt.) L. Crooks, R.F.C., Spec. Res.; Sec. Lt. (temp. Lt.) H. B. Dresser, R.F.C., Spec. Res.; Lt. A. G. Griggs, R.F.C., Spec. Res.; temp. Lt. M. F. W. Sampson, Gen. List; Sec. Lt. S. V. Green, R.F.C., Spec. Res.; Sec. Lt. J. C. Murray, R.F.C., Spec. Res.

* * *

The King has been pleased to award the Distinguished Conduct Medal to the following for gallantry and distinguished service in the field:—

1753 Flt. Serjt. G. A. F. Gibson, R.F.C. (Queen's Park, London, W.).
2015 Serjt. F. Hopper, R.F.C. (Burnley).
7756 1st Cl. Air Mech. A. Leyland, R.F.C. (Burnley).

FROM THE COURT CIRCULAR.

Buckingham Palace, April 1st.

The Queen, accompanied by the Princess Mary and the Prince Henry, and attended by the Lady Katharine Coke and the Earl of Cromer, visited the Works of Messrs. Vickers, Limited, in the London area this morning.

Her Majesty was received on arrival by Sir Trevor Dawson (Director) and the officials of the Company.

Major C. S. Paulet (Ministry of Munitions) was also in attendance.

Pilot's Wonderful Escape Thanks to "TRIPLEX" SAFETY GLASS

Another Striking Example of "Triplex" Trustworthiness :-

DEAR SIRS,

.....While flying an Avro I crashed into a wireless car fitted with windows composed of your glass, hitting the car with such force as to completely smash in the whole of one side.

The sheet of glass was quite intact, but while being passed from hand to hand a few pieces were rubbed off.

The windscreen was also badly shattered but also held together in the same remarkable manner as the sheet of glass.

My goggles—also Triplex—were cracked all over and undoubtedly saved my eyes, since my face struck the forward edge of the cockpit with such force that it gashed my nose, necessitating seven stitches.

Yours, etc.,
XXXXXX XXXXX,
R.N.A.S.

Use "TRIPLEX" exclusively for GOGGLES, WINDSCREENS, WINDOWS OBSERVATION PANELS, Etc., Etc.

The Triplex Safety Glass Co , Ltd.,
(Reginald Delpech, Managing Director),
1, Albemarle Street, Piccadilly, London, W.1.
Telephone—1340 Regent.
Telegrams—"Shatterlys, Piccy, London."



NAVAL.

The Casualty List.

Reported March 29th.

Accidentally Killed.—Jones, Prob. Flt. Officer A. V., R.N.
Missing.—Sands, Flt. Lt. Ll. A., R.N.
Moyle, Flt. Sub-Lt. W. A., R.N.
Seriously Wounded.—Bambridge, Flt. Sub-Lt. F. E. A., R.N.
Slightly Wounded.—Glen, Flt. Lt. J. A., R.N.
Accidentally Injured.—Ley, Prob. Flt. Officer G. V., R.N.
Thomas, Prob. Flt. Officer, A. H., R.N.
McLeod, Prob. Flt. Officer, H. J., R.N.
Previously reported Missing (Believed Prisoners) now reported Prisoners).—Hackman, Flt. Comdr. T. R., R.N.
Piper, Obsr. Lt. T. H., R.N.

Reported April 1st.

Died of Injuries.—Wimbush, Flt. L. E. B., R.N.
Missing (believed Killed).—Armstrong, Flt. Comdr. F. C., D.S.C., R.N.
Slightly Wounded.—Chisam, Flt. Lt. W. H., R.N.
Accidentally Injured.—Archer, Flt. Sub-Lt. A. W., R.N.
Quayle, Flt. Sub-Lt. S., R.N.
Grier, Prob. Flt. Officer E. G., R.N.
Simmons, Mr. A. H., Wt. Officer, II. Gr., R.N.A.S.

PERSONAL NOTICES.

Deaths.

JONES.—Prob. Flt. Officer Alan Vestey Jones, R.N.A.S., who was killed in an aeroplane accident in Lincolnshire on March 23rd, was the second son of Mr. and Mrs. David D. Jones, Strathleven, Oakleigh Park, London, N. He was 19 years of age.

WIMBUSH.—Flt. Lt. Lea Ewart Barnes Wimbush, R.N., who died on March 28th, of injuries received in a flying accident on the previous day, aged 19, was the eldest son of Mr. and Mrs. John Wimbush, of 13, Pembroke Gardens, Kensington. He was educated at Glengorse, Eastbourne, and at Haileybury. After leaving school he joined the R.N.A.S. in June, 1916, and went out to France in February, 1917. He was wounded in an air fight when flying over the enemy's lines in May of that year. For the last eight months he had been acting as instructor, and was just about to take up an appointment on active service.

Births.

CARTER.—On March 26th, to the wife of Acting Lt. Comdr. B. C. Carter, R.N.V.R. (née Penney), of 20, Bushnill Road, Upper Tooting, S.W.17, a daughter.

FELLOWES.—On March 20th, at 38, Lowndes Square, the wife of Wing Comdr. Peregrine F. M. Fellowes, D.S.O., R.N.A.S., of a son.

MILITARY.

G.H.Q. Communiqués.

March 26th, 9.20 p.m.—On the 25th inst. our aeroplanes were employed almost entirely in bombing the enemy's troops and transport massed in the areas behind the battle front, and in attacking them with machine-gun fire from a low height.

A total of 22 tons of bombs were dropped by us in this work, and over 100,000 rounds were fired from machine-guns. All our pilots reported that the ground targets offered by the enemy surpassed description, and that they were able to drop their bombs with accuracy, and to fire with effect right into the centre of infantry battalions in close formation, and into columns of cavalry and transport.

A certain amount of fighting in the air took place, but it was less intense than on the previous day. Thirteen hostile machines were brought down by our aeroplanes, and 10 were driven down out of control.

Eight of our machines are missing. The majority of our casualties were caused to low-flying machines by fire from the ground.

During the night our night-flying aeroplanes continued to bomb and to attack with machine-gun fire the enemy's troops in his forward areas, and his transport on the roads leading to the front.

March 27th, 10.5 p.m.—Great concentrations of our aeroplanes were carried out to-day over points threatened by the enemy, and masses of our machines attacked with machine-gun fire and bombs the enemy's infantry and cavalry.

Thirty tons of bombs were dropped by us, and hundreds of thousands of rounds of ammunition were fired into the enemy.

While this fighting was maintained throughout the day, our infantry aeroplanes kept watch along the front and reported the changes in the situation as they occurred

Twenty hostile machines were brought down in air fighting, and two other German aeroplanes were shot down by our anti-aircraft guns.

Twelve of our aeroplanes are missing.

During the night our night-flying squadrons kept up a continuous attack upon the enemy's troops in Bapaume, Cambrai, and Péronne.

Twenty-five thousand rounds were fired by them, and 24 tons of bombs were dropped on important centres of the battle front.

In addition, four tons of bombs were dropped on Valenciennes railway station, through which the enemy's troop trains were passing on their way to the front.

March 28th, 9.50 p.m.—On the 27th inst. low-flying was again carried out by large bodies of our aeroplanes, while our infantry machines continued the work of reporting the position of our battle line.

Over 30 tons of bombs were dropped by us, and a quarter of a million rounds of ammunition were fired from a height that ensured accuracy on different targets. Severe casualties are known to have been inflicted on the enemy, and the bringing up of his troops and ammunition was delayed.

Twenty-four German machines were brought down in air fighting, and seven others were driven down out of control. Two hostile observation balloons were also destroyed

Nineteen of our machines are at present missing, but a proportion of these are believed to have landed on our side of the line. Very heavy fire directed against our machines from the ground accounted for the greater portion of our casualties.

During the night the bombing of Bapaume, Bray, and Péronne was continued with the utmost vigour. Over a thousand bombs were dropped, and thousands of rounds of ammunition were fired at good targets, which were plentiful and easy to see in the moonlight.

Our pilots saw their bombs bursting in the middle of columns of troops and transport and on encampments.

Four of the aeroplanes employed are missing.

On the 27th instant the Sablons station at Metz was bombed. Well over a ton of bombs were dropped; good bursts were seen on the sidings and alongside the railway.

On the 28th instant our machines carried out a successful raid on the station at Luxemburg. Twenty-one heavy bombs were dropped, and several were seen to burst on the objectives.

All our machines returned from both raids.

March 29th, 8.50 p.m.—On the 28th inst. our aeroplanes carried on their attacks with bombs and machine-gun fire on hostile troops on the battle-front.

The majority of these attacks took place south of the Somme, in which area large concentrations of the enemy's troops were constantly reported.

The work was continued till dark in spite of rain storms and low clouds, a total of 26 tons of bombs being dropped, and nearly a quarter of a million rounds of ammunition fired by our pilots upon different targets.

Artillery work and photography were also carried out as usual on the quieter parts of the front.

There was not much fighting, considering the number of British machines in the air, but on the battle-front fire from the ground was again very heavy.

Nine German machines were brought down and five others driven down out of control. In addition, two hostile machines were shot down by fire from the ground.

Twelve of our machines are missing.

March 30th, 8.40 p.m.—During the morning of the 29th instant low clouds and rain greatly interfered with flying, but, in spite of the weather, valuable work was again accomplished by our aeroplanes.

Our machines were concentrated upon the battle front south of the Somme, where observers had previously reported large columns of the enemy advancing from the east. Many bombs were dropped and thousands of rounds of ammunition were fired upon these columns.

A good deal of fighting took place, the enemy's low-flying machines being particularly active in this area. Nine hostile aeroplanes were brought down and two others were driven down out of control.

Two of our machines are missing.

During the night over 12 tons of bombs were dropped on Bapaume and on roads in the vicinity, and also on roads and villages east of Arras. Direct hits were obtained on dumps and transport and on the railway line.

One of our machines has not yet been located.

March 31st, 8.48 p.m.—After midday on the 30th instant the weather completely broke, but, in spite of driving rain, our pilots continued to take part in the battle south of the Somme, and dropped bombs and used their machine-guns until a late hour on the targets offered by the enemy.

Useful reports as to the location of hostile troops were brought in, and in the northern area of the battle a certain amount of work in conjunction with our artillery was carried out.

There was heavy fighting in the air between our low-flying machines and those of the enemy. Twelve hostile aeroplanes were brought down and three others driven down out of control. One hostile balloon was destroyed by our machines, and another two German aeroplanes were shot down by our anti-aircraft guns

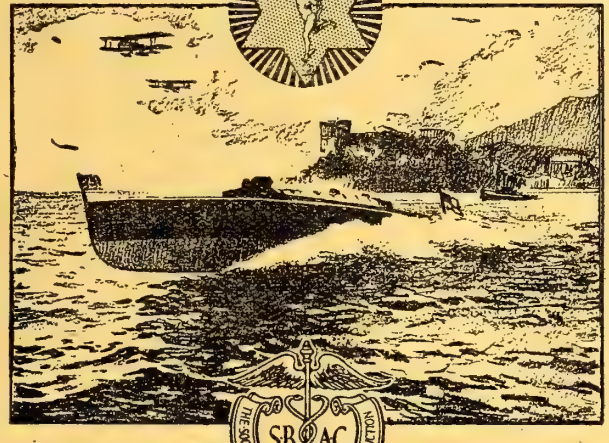
Five of our machines are missing.

April 1st, 9.29 p.m.—On March 31st our observation balloons and aeroplanes were active, the good visibility enabling the

S·E·SAUNDERS

LIMITED
Est. 1830

DESIGNERS & CONSTRUCTORS OF AIR AND MARINE CRAFT



THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS
SB AC

Head Office and Productive Works

EAST COWES. I.W.

Erecting & Testing

Solent Yard, Cowes, & Osborne Works, E. Cowes
SEAPLANES

West Medina Aerodrome
East Cowes
LAND MACHINES

Telegrams "CONSUETA EAST COWES"
'Phone COWES 193 (4 Lines)

G. Ibold & Sons.

former to carry out useful work in conjunction with the artillery.

The activity of our aeroplanes was chiefly centred south of the Somme. A close watch was kept on the enemy's movements in this area, and a large column of hostile troops or transport seen was bombed and engaged with machine-gun fire.

Very little fighting took place in the air. Two hostile machines were brought down and one other was driven down out of control.

Four of our machines are missing.

Four of our machines previously reported missing have since returned to their units.

Night flying was not possible till after midnight owing to low clouds. From midnight until dawn our bombing machines were constantly at work. Twenty-four tons of bombs were dropped on the railway stations at Douai, Cambrai, Bapaume, Rosières, and Thourout, and on the docks at Bruges.

Troops and transport in the neighbourhood of Bapaume and Chaulnes were also attacked with bombs and machine-gun fire.

All our machines returned.

War Office Communiqués.

March 27th.—The G.O.C, Palestine, reports:—

During the fighting of the 25th one enemy aeroplane was destroyed in aerial combat.

March 28th.—The G.O.C. Palestine reports:—

Our aeroplanes shot or drove down four enemy machines, and heavily bombed the enemy troops, transport, and trains on the Hedjaz railway, many direct hits being observed.

March 29th.—The G.O.C. Macedonia reports:—

On the morning of March 20th an enemy aeroplane was driven down behind our lines in an aerial fight on the Struma front. The pilot and observer were taken prisoners.

On the morning of March 24th our machines bombed the aerodrome at Drama with great success; 57 bombs burst on the aerodrome, and four hangars were badly damaged.

March 31st.—The G.O.C. Palestine reports:—

On March 28th and 29th our operations to the east of the Jordan was continued successfully. Two hostile aeroplanes were destroyed.

March 31st.—The G.O.C. Italy reports:—

The success of the Flying Corps has continued. Ten enemy aeroplanes have been destroyed and four driven down out of control since my last report, with a loss of one to ourselves.

In this total is included seven machines destroyed, and three driven down out of control on March 30th. On this date a patrol of three British machines attacked 19 enemy aeroplanes over an enemy aerodrome east of the Piave, destroying six of them.

Since their arrival in Italy the Flying Corps have now destroyed 83 enemy machines, and only lost 10 themselves.

* * *

The Secretary of the War Office announces that the King has been pleased to approve of the award of the Victoria Cross to Sec. Lt. (Temp. Capt.) James Byford McCudden, D.S.O., M.C., M.M., R.F.C., for conspicuous bravery, exceptional perseverance, keenness and very high devotion to duty on various occasions during December, 1917, and January and February of the present year. The award will appear in the "London Gazette" at an early date.

The Casualty List.

Reported March 27th.

Previously reported Missing, now reported Killed.—Davidson, Sec. Lt. W., R.F.C.

Accidentally Killed.—Curtis-Beals, Sec. Lt. H., R.F.C.
Dale, Sec. Lt. A. P., R.F.C.

Missing.—Gaynor, Sec. Lt. H. F., Lond. R., attd. R.F.C.
Knaggs, Lt. K. J., R. War. R., attd. R.F.C.
Mayne, Sec. Lt. R. A., R.F.C.
Scott, Lt. V. W., E. Surr. R., attd. R.F.C.
Taylor, Sec. Lt. A. L. T., R.F.C.
Taylor, Sec. Lt. W. H., R.F.C.

Previously reported Prisoner, now reported Wounded and Prisoner in German Hands.—Morrison, Lt. K. S., R.F.A., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Jackson, Lt. G. G., R.F.C.

Canadian Forces.—Accidentally Killed.—Sinclair, Lt. C. D., E. Ont. R., attd. R.F.C

Wounded.—Kerr, Lt. S. H., E Ont. R., attd. R.F.C.
Taylor, Lt. G. W., Cav., attd. R.F.C.

Missing.—Heath, Lt. E. E., Cent. Ont. R., attd. R.F.C.

Reported March 28th.

Killed.—Jones, Sec. Lt. H. R., R.F.C.
Tancock, Lt. O. G., M.C., R.F.A., attd. R.F.C.
Warren, Sec. Lt. A., Leic. R., attd. R.F.C.
Young, Sec. Lt. G. C., R.F.C.

Wounded.—Ridewood, Capt. O. E., A.S.C., attd. R.F.C.

Missing.—Holt, Sec. Lt. J. L., R.F.C.
Shakesby, Sec. Lt. C. V., E. Yorks R., attd R.F.C.
Shaw, Sec. Lt. T. G., R.F.C.
Tayler, Capt. St. C. C., M.C., R. Suss. R., attd. R.F.C.

Reported April 1st.

Previously reported Missing, believed Killed, now reported Killed.—Barton, Sec. Lt. F. H., R.F.C.

Died of Wounds.—McDonell, Sec. Lt. G. O., R.G.A., attd. R.F.C.

Wounded.—Robinson, Sec. Lt. F. H., R.F.C.
Venmore, Sec. Lt. W. C., Lond. R., attd. R.F.C.

Missing.—Clark, Lt. N., R.F.A., attd. R.F.C.; Ivamy, Sec. Lt. W. G., R.F.C.; Lee, Sec. Lt. E. B., R.F.C.; Luxmoore, Capt. F. L., R.F.C.; McCudden, Sec. Lt. J. A., M.C., R.F.C.; Matson, Lt. A. W., R.F.C.; Neale, Sec. Lt. R. E., R.F.C.; Payne, Sec. Lt. H. A., R.F.C.; Russell, Sec. Lt. G., R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in German Hands.—Young, Sec. Lt. J. H., Lond. R., attd. R.F.C.

Indian Forces.—Previously reported Missing, now reported Killed.—Dalley Lt. J. P., I.A.R.O., attd. R.F.C.

* * *

Casualties Among N.C.Os. and Men.

The Dates are those of the Official List.

Killed.

March 18th, R.F.C.—Brooke 43573 2nd Cl. Air Mech. T. (Blackpool); McBrearty 51227 3rd Cl. Air Mech P. (Mountcharles).

Previously Missing, now reported by the German Government Killed or Died of Wounds.

March 19th, R.F.C.—Ridgway 61603 2nd Cl. Air Mech. F. J. (Old Trafford).

Died.

March 21st. R.F.C.—Renshaw 77983 2nd Cl. Air Mech. J. H. (Peterborough).

Wounded.

March 18th, R.F.C.—Smith 3116 Serjt. W. E., D.C.M. (Bowes Park, N.).

March 22nd. R.F.C.—Hillier 26621 1st Cl Air Mech. A. (Bognor); Hynes 113877 3rd Cl. Air Mech. J. (Cork).

Missing.

March 20th, R.F.C.—Ireland 114348 2nd Cl. Air Mech. R. (Prince Edward Island, Canada).

March 22nd.—Hughesden 27194 Serjt. A. (Raynes Park, S.W.).

Australian Imperial Force.

Died

March 19th, A.F.C.—Morgan 1130 A.

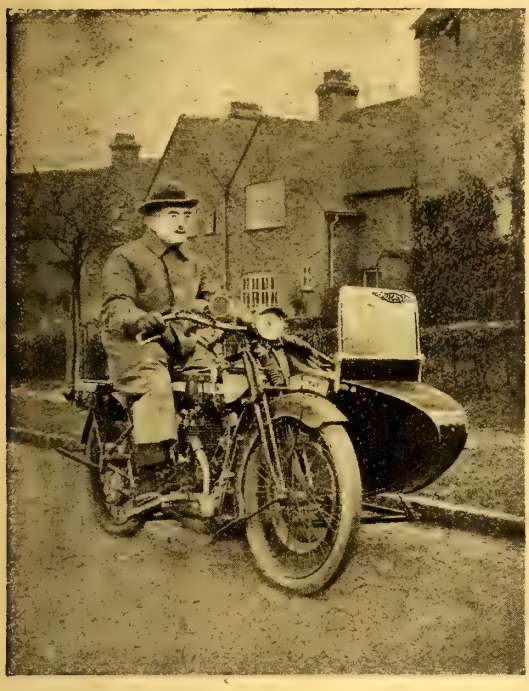
PERSONAL NOTICES.

Deaths.

ANDERSON.—Capt. Edward Kerr Anderson, R.F.C., who died as the result of a flying accident at Winchester on March 16th, was the youngest son of W. J. Anderson, Glasgow. He was 21 years of age.

Capt. Anderson was 21 years of age and the youngest son of Mr. William J. Anderson, of Glasgow. He had his captaincy in the Army in March of last year, when he was appointed flight commander, R.F.C. He was an experienced pilot, and very popular with all ranks at Wing headquarters.

ANGUS.—Capt. Robert Edward Angus, Ayrshire Yeo. and R.F.C., who was reported as missing on November 20th, 1917, and is now reported dead, was 23 years of age. He was educated at St. Ninian's, Moffat, and Loretto, and, on leaving school at Easter, 1914, before going up to Cambridge in the autumn, he obtained a commission in the Ayrshire Yeomanry, and was mobilised on the outbreak of war. He went out to Gallipoli with his regiment in the autumn of 1915, and, after the evacuation of the Peninsula, he saw service with the Yeomanry in Egypt and also for a time with the armoured cars. He applied to join the R.F.C., and trained in Egypt and afterwards in this country, and went out to the front with his squadron last October. After a month's service he was promoted flight commander (being described by his commanding officer as the best pilot in the squadron) and was due to leave his old squadron on the morning of an attack, but at his own request he was allowed to take part in it. He was last seen, in the mist which prevailed that day, leading his squadron, about five miles behind the lines, to drop his bombs on a German battery, which he put out of action. No further details of his fate have since been ascertained except the news of his death through German sources. Capt. Angus was the only son of the late James Angus, J.P., of Ochiltree House, Ayrshire, and of Mrs. Angus, of Hill House, Leckhampton, Cheltenham, and grandson of Mr. Robert Angus, D.L., of Ladykirk, Ayrshire.



Get into touch with "ASCOL" Representatives

IN order to bring our business into closer touch with Aircraft Manufacturers throughout the country, we have now appointed representatives in Lancashire, Yorkshire, the Midland Counties, and Ireland (*see below*). We shall shortly appoint other representatives for the Eastern and Western Counties, details will be announced later. Three representatives are attached to our Head Offices at Long Acre for the London District.

These gentlemen will call regularly, and will keep firms posted as to stocks in hand and deliveries expected. We trust that our clients will make use of their services, to the advantage of all concerned.

LANCASHIRE DISTRICT.

C. T. CHIVERS, 36, Corporation Street, MANCHESTER.
Telephone—6942 City.

IRELAND.

F. COE WILSON, 149, Donegal Street, BELFAST.
Telephone—297. Telegrams—"Comfort," Belfast.

SOUTH COAST.

J. S. BIRKS, 93, Above Bar, SOUTHAMPTON.
Telephone—40 Southampton.
Telegrams—"Upcast, Southampton."

MIDLAND COUNTIES.

L. J. SERIN, 36, International Exchange, Edmund Street, BIRMINGHAM.
Telephone—982 Central. Telegrams—"Upcast, Birmingham."

YORKSHIRE DISTRICT.

H. DE GREY FIRTH, Prudential Buildings, Park Row, LEEDS.
Telephone—3829 Central. Telegrams—"Jupiter, Leeds."

JAMES THOMSON & SON (MOTOR FACTORS), LTD.

NEWCASTLE-ON-TYNE ... ... 73, Pilgrim Street.
Telephone—City 328 (2 lines).
Telegrams—"Distribute, Newcastle-on-Tyne."

EDINBURGH: Castle Works, Lady Lawson Street.
Telegrams—"Accelerate, Edinburgh."
Telephone No—Central 8843 (4 lines).

GLASGOW ... ... 65, Mitchell Street.
Telephone—Central 754 (3 lines).
Telegrams—"Accelerate, Glasgow."

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Managing Director—G. H. MANSFIELD.

Works—Little James St., London, W.C.1.

Telephone—Gerrard 276 (Private Branch Exchange.)

Telegrams—"Upcast, Rand," London.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

Head Offices, Showrooms, and Stores:

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

ASCOL

BARLOW.—A verdict of "Accidental death" was returned at the inquest at Dover on March 20th on the body of Lt. Harold Loftus Barlow, R.E. and R.F.C., who was killed while flying at dusk owing to his being caught in a mist which came up suddenly.

BUTLER.—Capt. Desmond George Butler, Leinster Regt., attd. R.F.C., killed while flying on March 17th, aged 23, was the elder son of the late Capt. G. J. Butler, R.E. He was educated at Plymouth College and joined up the day war was declared and was sent to France on August 25th. A few months later he was recommended for a commission, which he obtained in the 1st Leinster Regt. He was wounded in the battle of Ypres in 1915. On his return to the front in September he was attached to the trench mortars and promoted lieutenant in February, 1916, and captain in March, and given the post of D.T.M.O. on the Headquarter Artillery Staff of a division, He was present at the battles of the Somme, Arras, and Vimy Ridge, being mentioned in dispatches for his excellent work. In August, 1917, he applied for a transfer to the R.F.C. and came to England for his training and at one aerodrome he had acted as adjutant since Christmas. He was a true sportsman and a general favourite in his squadron and gave every promise of becoming a daring and brilliant aviator.

CAMPBELL.—Maj. Charles Duncan Miles Campbell, R.F.C., who died at Matlock on March 9th, was the son of the late C. Campbell and of Mrs. Campbell, of 17, South Vale, Upper Norwood, and the husband of Mrs. Campbell of Worbeck Road, Anerley. He was 36 years of age, and received his commission on the outbreak of war, proceeding to France in August, 1914. At the end of the year he was transferred to the R.F.C., where he served as an observer and specialised in the photographic section. He visited Italy, Canada and the United States in connection with important duties, and he was commanded by the King to exhibit to him certain photographs taken from aeroplanes. Maj. Campbell was a M.O.B.E.

CARTWRIGHT.—Sec. Lt. Ronald W. St. George Cartwright, R.F.C., who was killed on Feb. 26th, was the second son of Mr. Arthur Cartwright, late H.M. Inspector of Schools for the Worcestershire District, and of Mrs. Cartwright, of Rothbury, Hay, Hereford, and grandson of the late Colonel Heywood, of Great Malvern. He was one of three brothers in the Forces, the youngest of whom, Sec. Lt. Eric Cartwright, 4th Leinster Regiment and M.G.C., was killed in the battle of the Somme in 1916. He was educated at Bilton Grange, Rugby, and Malvern College. He had only been a few months in British Columbia when war broke out, and joining up immediately in Victoria he came over with the Canadian contingent early in 1915. After only a few days in England his company was ordered out to reinforce the Canadians at Ypres, and with the 16th Canadian Scottish he served through all the fighting there and in the charge at Festubert. On one occasion he was buried by a big shell, and shortly afterwards was invalided home, and had to undergo an operation for appendicitis. He suffered from shell shock for 18 months, but made a marvellous recovery, and almost before he was really fit again he obtained a commission in the R.F.C., and went to the front in September, 1917.

CASSWELL.—Lt. Eric Denison Seymour Casswell, Rifle Brigade, attd. R.F.C., was the youngest son of Mr. and Mrs. Casswell, of Rusper, Sussex. He was a scholar and exhibitioner at Tonbridge School, where he was in the cricket XI., and proved himself a good all-round athlete. From Tonbridge he gained a scholarship at Pembroke College, Cambridge, and he had been in residence there a year when war broke out. He obtained a commission in the Rifle Brigade. For a time he was attached to the Army Cyclist Corps, and he went to France early in 1915. On rejoining the Rifle Brigade he saw much fighting, and twice he was wounded slightly. In the summer of 1917 he came to England to be trained for the R.F.C., returning to the front early in October as an observer in a night-flying squadron. With his pilot he was killed in action on the night of November 7th, 1917. Mr. Casswell was 23 years of age.

CHATTERTON.—Capt. Roden Latham Chatterton, Leinster Regt., attd. R.F.C., who died in hospital on March 29th from injuries received in a flying accident on March 27th, was the only son of Col. G. D. L. Chatterton, Ind. Army, and Mrs. Chatterton. He was 22 years of age.

CLARK.—On March 20th Sec. Lt. Eric Alan Clark, R.F.C., was accidentally killed while flying. He was the only son of Mr. and Mrs. C. W. H. Clark, "Fernhurst," Aughton, and was 20 years of age.

COLEY.—Lt. Allan Cowan Coley, R.F.C., who was killed on active service on March 6th, was 19 years of age, and the eldest son of the late Harry C. Coley, of Bishops Stortford, and of Mrs. E. R. Holland, of Surbiton. He had his commission in the Army in August, 1916, and was given his "wings" in the Royal Flying Corps in April of last year.

COOK.—Lt. F. R. Cook, East Yorkshire Regt., attd. R.F.C., whose death has already been notified, transferred to the R.F.C. when in India in Dec., 1916, and was appointed an observer in Feb., 1917, with seniority from Dec. 15th, 1916. He commenced his training in India, and was subsequently transferred to Egypt, where he was afterwards appointed an instructor.

CORBETT.—Maj. R. D. de la Cour Corbett, Ind. Inf., attd. R.F.C., who was born in 1881, was the elder son of the late Col. R. de la Cour Corbett, D.S.O., R.A.M.C., and Mrs. de la Cour Corbett, of 13, Goldington Road, Bedford, and was educated at Bedford and Sandhurst. He was a keen athlete and sportsman, and played Rugby football for the R.M.C. against the R.M.A. in 1900. In 1901 he was gazetted to the Royal Irish Rifles and served through the South African War, being awarded the medal with four clasps. In 1904 he transferred to the Indian Army and was gazetted to the 48th Pioneers, and afterwards became adjutant of the regiment. In 1908 he was sent on famine duty in the Utroula District, and in 1912 was appointed tutor to the young Raja of Awa. When war broke out he rejoined his regiment and went to Mesopotamia in November, 1914. He was one of the gallant band who under General Townshend were besieged for five months in Kut, and was taken prisoner at the fall of that garrison and sent to Kastamuni, in Asia Minor. He was mentioned in dispatches in May, 1916. The camp at Kastamouni was broken up in October, 1917, and the prisoners marched to Changri, where he died on Christmas Day.

One who shared captivity with Maj. Corbett says:—

"The Turks have treated officer prisoners fairly well, and anybody who, like the writer, saw him at that place, fit and cheerful, a few months ago, would not have thought it possible that he would not survive the war. Maj. Corbett died suddenly from rupture of the heart, on return from tobogganing at Changri, whither all the prisoners had been moved. There was no better-liked officer at Kastamuni. He was the staff officer of one of the two parties into which the 200 prisoners, nearly all from Kut, were divided, and was the channel of communication between the prisoners and the Turkish authorities. He filled this unenviable position with tireless energy and tact, and no one who shared captivity with him will ever forget his cheery presence and unfailing readiness to help. In spite of his many duties he found time to run a carpenter's shop and also to work daily for some months at the head of a party of officers who enclosed the graves of prisoners who died at Kastamuni.

COSTA.—Sec. Lt. Liugi G. Costa (Instructor), R.F.C., who was killed in Norfolk on March 19th, as the result of an aeroplane accident, was the eldest son of Cavaliere and Signora Costa, of West Hill, Sydenham, and Pudding Lane, E.C. He was educated at Dulwich College, where he was captain of the first Cricket XI. He was also a good football player and an excellent swimmer and oarsman. He enlisted in the R.F.C. in March, 1917, and shortly afterwards gained his commission, being awarded his "wings" last January, since when he had been doing good service as an instructor. He was 18 years and 9 months of age.

COWIE.—Sec. Lt. George Cowie, R.F.C., reported missing on October 22nd, now officially reported killed on that date, in his 19th year, was the only son of Captain and Mrs. A. M. Cowie, of Dufftown, Banffshire. He was educated at Alton Burn, Nairn, in Brussels, and at Rugby (Schoolhouse), and was in the school eleven, and in the swimming six. He was killed as the result of a collision during an engagement in the air, and fell behind the enemy lines.

CUBBON.—Capt. Francis Richard Cubbon, M.C., R.F.C., who is reported killed on June 9th, 1917, was born in Poona on Nov. 29th, 1892, and was the only surviving son of Capt. R. Cubbon, S. and T. Corps, I.A., and of Mrs. Cubbon, of Quetta. He was educated at Alleyne College and Dulwich College, and passed from Sandhurst into the Indian Army in 1911, being attached for a year to the Yorkshire and Lancashire Regiment in Karachi, and then appointed to the 72nd Punjabis, with whom he served on the North-West Frontier. In November, 1915, he was invalided home and on recovering was attached to the Royal Warwicks and then to the R.F.C. He went to France as an observer on April 7th, 1917, winning his Military Cross on May 10th and a bar to it three days later—both being awarded for "splendid performances." Although only two months at the front Capt. Cubbon brought down more than 23 enemy machines.

DALE.—Sec. Lt. A. P. Dale, who has been accidentally killed whlise flying in Egypt was, before the war, the Unionist agent at Chesterfield.

DAVIES.—"Accidental death" was the verdict recorded at Oxford on March 18th on Lt. Llewellyn C. Davies, R.F.C., who died in hospital of injuries received in a bad landing at Abingdon.

DAWSON.—Lt. H. Percy Dawson, R.F.C., was killed at a Hampshire aerodrome recently. He was 27 years old and lived at Hardslea, Crouch End. He had seen much service overseas. Mr. Dawson, at the time of his death, was about to return to France.

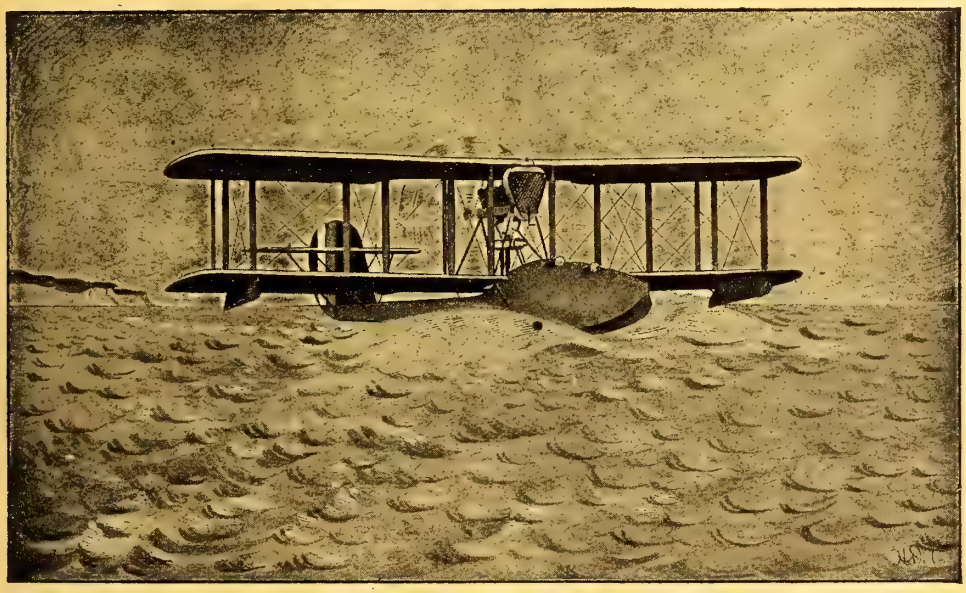
(*Continued on page* 1281.)

A PRE-WAR FIRM.

THE NORMAN-THOMPSON FLIGHT CO., LTD.

DESIGNERS & CONSTRUCTORS OF FLYING BOATS.

ESTABLISHED 1909.



"Getting under way."

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆

"THE FIRM WHO GAVE THE FLYING BOAT TO THE NAVY."

Works:
MIDDLETON
BOGNOR,

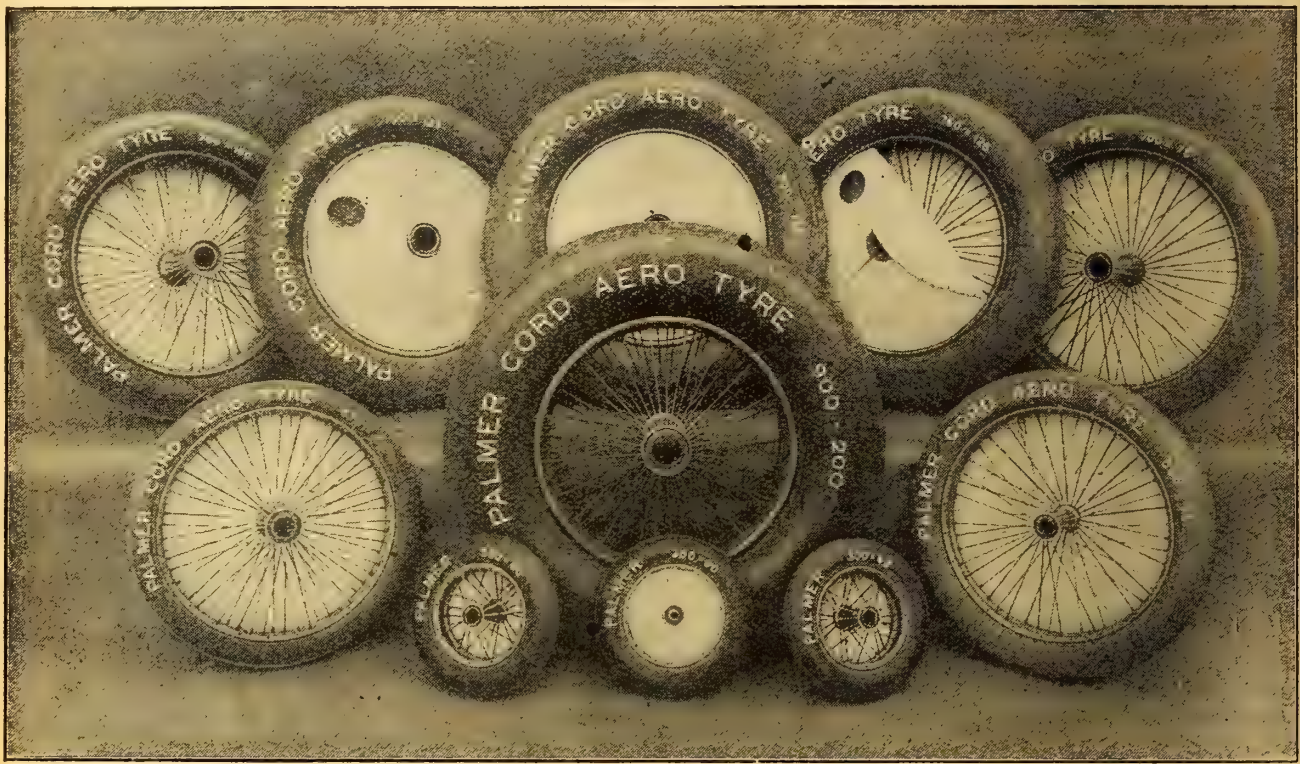
Bognor 48.

London Office:
DEWAR HOUSE,
HAYMARKET, S.W.1.

Gerrard 7385.

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m m
300×60	16	111.12	25.4	Central
"	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
575×60	111	150.	38.09	104/46
"	21	160.	28.	Central
"	34	150.	31.75	104/46
650×65	78	178.	44.45	132/46
"	100	178.	38.09	132/46
"	101	178.	31.75	132/46
600×75	111	150.	38.09	104/46
"	21	160.	28.	Central
"	34	150.	31.75	104/46
700×75	78	178.	44.45	132/46
"	79	178.	44.45	Central

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
700×75	100	178.	38.09	132/46
"	101	178.	31.75	132/46
700×100	92	185.	55.	135/50
"	95	185.	55.	Central
"	77	178.	44.45	132/46
"	93	150.	40.	Central
"	33	150.	38.09	Central
"	99	178.	38.89	132/46
"	96	178.	55.	132/46
750×125	92	185.	55.	135/50
"	95	185.	55.	Central
"	77	178.	44.45	132/46
"	93	150.	40.	Central
"	33	150.	38.09	Central
"	99	178.	38.89	132/46
"	96	178.	55.	132/46

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
800×150	82	185.	55.	135/50
"	85	185.	55.	Central
"	†36	185.	55.	135/50
"	†40	185.	60.32	135/50
1000×150	97	250.	65.4	Central
"	102	185.	55.	125/60
"	201	185.	60.32	125/60
900×200	39	185.	55.	Central
"	42	185.	60.32	125/60
"	47	185.	55.	125/60
"	202	185.	60.32	Central
1100×200	52	185.	55.	116/69
"	57	185.	55.	Central
"	203	185.	60.32	116/69
"	204	185.	60.32	Central

†Wheels Nos. 36 and 40 are of stronger type than the other wheels for 800x150 tyres.

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

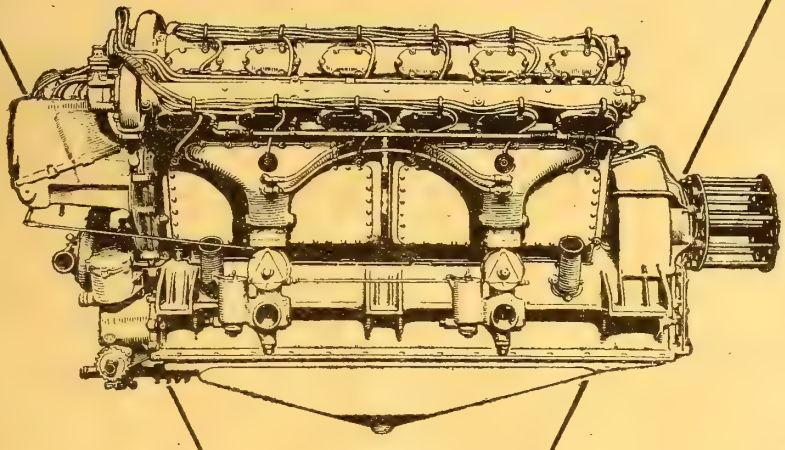
119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

SUNBEAM-COATALEN AIRCRAFT MOTORS

Are engaged in playing their parts in well nigh every theatre in which the Allies' arms are engaged, and have won distinction in this test of unprecedented proportions and duration.



12 CYLINDER SUNBEAM-COATALEN AIRCRAFT ENGINE.

THE SUNBEAM MOTOR CAR CO., LTD.——————WOLVERHAMPTON.

" " CONTRACTORS TO " "
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge Motor Factory

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.

BY C. SYLVESTER.

Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

INTRODUCTION.

In dealing with the design of the internal combustion engine, the first thing to be taken into consideration is the purpose for which the engine is to be used. Having definitely ascertained this, the details of the design and construction may be carried out with the certainty that the results will meet the requirements. From this it is meant that engines that are designed for one class of work are not so satisfactory when required to do other work. Considerable care should therefore be taken to obtain a correct idea of the load before the design is commenced.

Internal combustion engines may be divided into three types:—

1. The petrol engine (including aero engines).
2. The oil engine (Diesel, semi-Diesel, and oil).
3. The gas engine.

The Petrol Engine.

The aero engine is a petrol engine almost in a class of its own, its feature as a prime mover being that it is designed solely for use in connection with aircraft. As such it may truly be said that the whole of the design is carried out to meet aeronautical conditions, not only as far as weight is concerned, but from an efficiency point of view. That is, if we really can have a maximum efficiency with a minimum amount of weight, then we may say that the aero engine of to-day adequately meets these requirements.

The production of the charge of a petrol engine may be said to be that petrol flows from a tank to a carburettor fitted on or near the engine. The petrol is vapourised in the carburettor and mixed with air by the suction of the piston. The mixed petrol gas and air are drawn through the induction pipe into the cylinder. Here the mixture is exploded by a spark across the points of a sparking plug, the spark being produced by means of a magneto driven by the engine, or by an accumulator operating a coil.

The Diesel Engine.

In dealing with the Diesel engine we are considering a very different type from the aero engine, from many points of view. One instance is that where an aero engine depends upon the electrical sparking of a plug, there is no ignition necessary from external sources to produce combustion in a Diesel engine.

Briefly to explain how combustion is brought about in a Diesel engine, it may be said that ordinary air is admitted into the cylinder and compressed to about 480 lbs. per square inch. This compression causes the temperature to rise to as much as 1,000 degrees Fahrenheit, and, when thus compressed, a spray of petroleum vapour is injected which is instantly burnt.

Diesel engines are now constructed in sizes up to 4,000 h.p., and, at one time, this type of engine was regarded as the serious opponent of the steam engine. As a matter of fact, as far as cost, maintenance, and efficiency are concerned, it may be said to be superior to the steam engine. It is certainly used at the present time under conditions where it is not possible to use the steam engine, one of these conditions being the propelling of the submarine.

As far as the design of Diesel engines is concerned, we do not have to take weight into consideration, as we do when designing an aero engine. From this it is not advocated that unnecessary material should be used in the construction of these engines, but one does suggest that as the limits of aero engine construction are cut so fine, it is really practical to allow a greater margin for material. There is a great deal of scope for improvement in the design of Diesels which will, no doubt, be used to advantage, as in some quarters it is regarded as the engine of the future. As regards thermal efficiency it is quite 25 per cent. ahead of the gas engine, it also has the advantage of being able to use crude petroleum oil, of which supplies are available in large quantities in almost every part of the world. This, of course, is of the utmost importance where the cost of fuel is concerned, especially at the present time.

Apart from its undoubted advantage over the steam engine as a prime mover for submarines, this engine is looked upon as the type of engine to adopt in small electrical power stations. Here, coupled direct to an alternating current or a direct current generator, it is far superior to the steam engine. This will be readily understood when the cost of erection and the maintenance of steam pipes, boilers, etc., are considered.

The Gas Engine.

We will now turn our attention to the gas engine. This type of engine, in comparison with the Diesel and the steam engine, falls much below them from an efficiency and economical point of view. It has the advantage, however, of being manufactured in such small sizes as to be appreciated for such work as driving main shafting in small workshops, and driving small generators, etc. Gas engines are also made in large sizes, 3,000-h.p. being quite common. Alongside the steam engine, these engines, if operated with producer gas, compare very favourably. The greatest drawback to the adoption of gas engines as a prime mover is that it is not always possible to obtain the gas for them. Where this is so, then the oil engine is to be preferred.

Oil Engines.

Oil engines are extensively used for small electrical installations. They can be started up in a very few minutes, after which very little attention is necessary. As far as the explosive charge of these engines is concerned they differ to every other type of internal combustion engine.

To explain briefly the production of the working charge it may be said that a cast iron container, termed a vaporiser, is fitted on the back end of the cylinder. Before the engine may be started, the piston must be placed at the commencement of the explosion stroke. The vaporiser is then made hot by means of a large paraffin blow lamp, and, when sufficiently hot, a spray of oil, and air compressed to about 60 lbs. per square inch, is injected into it. The explosion takes place, and the charge is forced into the cylinder, thus forcing the piston out. A camshaft controls the inlet and exhaust valves after the engine is once started.

In General.

From the above brief survey of internal combustion engines it will be seen that each type varies from the other more or less. As prime movers they are suitable for special work, but they must, at the present time, be considered practically useless for large generating stations when compared with the capabilities of the steam turbine.

From this one does not mean to state that it is not possible to produce an internal combustion engine to compare favourably with a steam turbine up to a certain horse-power, but one does say that, so far as the present design goes, it is not possible to produce one of anything like the capacity of the latest Curtis turbine, that is, 40,000 kilowatts.

As stated above, there are possibilities for the improvement

of the design of internal combustion engines, just as the steam turbine is an improvement on, yet a distant departure from, the steam engine. It is true that experiments have been recently carried out to combine the gas engine and the steam turbine, but it must be pointed out that, at the present time, a steam turbine plant operated from the waste heat from a gas engine involves a large expense in comparison with the increased power obtained. Should the cost of boiler fuel, however, be sufficiently high, a plant of this description might be commercially practical, but one fears that the matter will not receive serious consideration for some time to come.

In a gas engine one has high efficiencies at the high temperature end of the cycle, but one is unable to use the low temperature end. With the steam turbine, when modern condensing apparatus is used, the low temperature end of the cycle is used to the fullest extent. It would therefore appear that there are great possibilities in combining the two. However, on working out an actual case, it will be found that the work of the turbine would be comparatively small, really amounting to about 10 per cent. of the total output of the gas engine. From this it will be seen that the large amount of additional expense and complication involved would offset the saving in the cost of boiler fuel, that is, unless the fuel is comparatively expensive.

Metals and Alloys used in the Construction of Internal Combustion Engines.

A brief survey of the chief metals and alloys used in the construction of internal combustion engines will assist the student in the understanding, in a general way, of their make-up, value, and utility.

Aluminium.

In describing aluminium we would say that it is white in colour with a slight bluish-grey tinge. It is very light, highly malleable, but when pure it is too soft and weak for most purposes. It will unite with all metals except lead and mercury. It is attacked by most acids and alkalies, but it is unaltered by dry or moist air at any temperature.

The heat conductivity of aluminium is very high, being almost equal to that of copper.

Its electrical conductivity is about that of copper, but it is to be preferred to copper under certain conditions owing to its extreme lightness.

The tensile strength of aluminium varies according to its alloy and the form in which it is used. Sand castings have a tensile strength of 5 tons per square inch. Hard drawn aluminium wire has a tensile strength of 15.5 tons per square inch. If aluminium is mixed with about 7 per cent. of nickel it makes a very valuable hard alloy. Nickel-aluminium alloys have the same springy qualities of hard-drawn brass.

The specific gravity of aluminium is 2.6, the specific heat is .212, and its melting point is 658 degrees Centigrade.

An alloy of aluminium and zinc is used in the construction of aero engine parts, the percentages being 90 and 10 respectively.

Copper.

This metal is a peculiar red in colour and it is extremely tough. It is easily machined, may be drawn into very fine wire, or beaten into thin sheets. It is only slightly weldable and it is very brittle at temperatures approaching melting point.

Its electrical conductivity is extremely high, and when manufactured in hard-drawn sheets it is extensively used for the construction of the commutators of direct current motors and generators.

The specific gravity of copper is 8.7, its specific heat is .044, and its melting point is 1,083 degrees Centigrade.

Outside the electrical industry copper is not extensively used, but as an alloy with tin, zinc, aluminium, or nickel, it is the most used of all metals.

Tin.

This metal is white in colour with a faint yellow tinge. It is very soft and is easily rolled into sheets, but owing to its very low tenacity it cannot be drawn into wire. It is only slightly affected by exposure to air.

As an alloy with copper it is extensively used for pumps, gears, propellers, bushings, steam fittings, etc.

The specific gravity of tin is 7.29, its specific heat is .056, and its melting point is 232 degrees Centigrade.

Zinc.

This is white in colour and is very brittle. It may be rolled into sheets or drawn into wire at temperatures between 100 and 150 degrees Centigrade. At higher temperatures than this it is very brittle. As an alloy with copper it is in great demand.

Its specific gravity is 7.15, the specific heat is .024, and its melting point is 419 degrees Centigrade.

Antimony.

This a very peculiar metal, inasmuch that it is very brittle and crystalline and that it imparts this property to its alloys. It is white in colour and is easily powdered.

The specific gravity of antimony is 6.7, its specific heat is .051, and its melting point is 631 degrees Centigrade.

As an alloy with tin and lead it is valuable for white bearings, metallic packing, accumulator metal, electric fuse wire, hard solder, plumbers' metal, etc.

Copper-Tin.

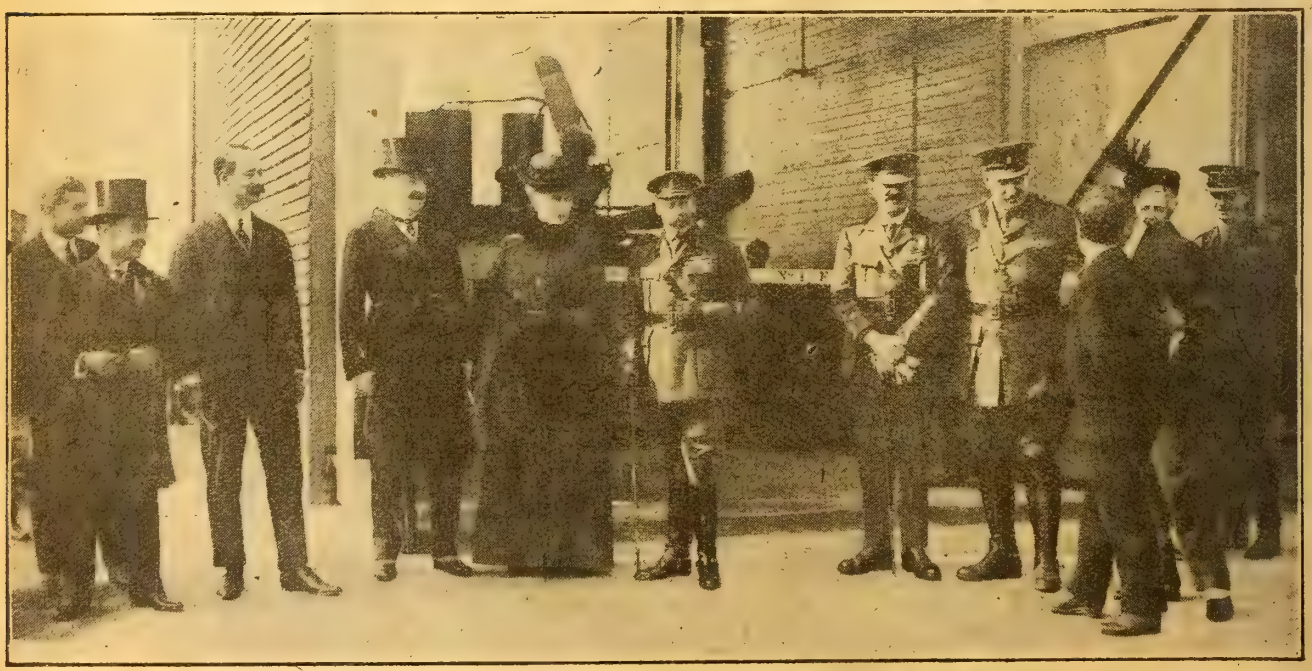
From the alloy of copper and tin we obtain gun-metal, bronze, and phosphor-bronze. The quantities of the respective metals are:—

Gun-metal.—88 per cent. of copper, 10 per cent. of tin, and 2 per cent. of zinc. The zinc is added giving fluidity to the alloy.

Bronze.—90 per cent. of copper, and 10 per cent. tin.

Phosphor-bronze.—91 per cent. of copper, 8.5 per cent. of tin, and .5 per cent. of phosphor.

The above alloys are used in the manufacture of bearings, small gears, pump bodies, connecting-rod bushes, etc.



A ROYAL VISIT: The King and Queen at the Works of Clement Talbot, Ltd. Their Majesties, with Lord Shrewsbury and Mr. Frank Shorland, in front of one of the Engine Test Sheds, receiving the Staff.

Britain Supreme in the Air!

ROLLS-ROYCE AERO ENGINES

like Rolls-Royce Cars are the best in the World. By their wonderful achievements they are making Britain and her Allies Supreme in the Air.

Describing the historic flight from London to Constantinople in thirty hours the "Autocar" says:

"The fact must be recorded that the Engine never failed for a moment throughout the entire journey to Constantinople. Great therefore as was the reputation of the Rolls-Royce Engine before the flight, the epic achievement described added new laurels to its wonderful career."

ROLLS-ROYCE

Contractors to H.M. Government. LTD.

14 AND 15, CONDUIT STREET, LONDON, W.C. 1.

Telegrams: 'Rollhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*

AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

Copper-Zinc.

From this alloy we obtain all our brasses.

Soft yellow brass consists of 70 per cent. copper, 29 per cent. zinc, and 1 per cent. tin.

Manganese-brass, or bronze as it is sometimes termed, consists of 59.5 per cent. copper, .5 per cent. tin, 39.5 zinc, and .5 per cent. of aluminium.

This is a valuable alloy of vastly improved tensile strength and elastic limit. It is used for general work, tubes for high pressure such as oil pipes, etc. One of the features of this alloy is that it resists corrosion.

Copper-Tin-Antimony.

The correct quantities of this alloy are: 4 parts of copper, 1 parts of tin, and 8 parts of antimony. This produces an excellent alloy which is extensively used for lining bearings. It is sometimes termed "Babbits metal."

Duralumin.

This is a complex alloy and it has created a great deal of attention in engineering circles. It is an alloy of aluminium, copper, magnesium, and manganese. The percentage of aluminium is upwards of 90 per cent.

It has a specific gravity of 2.79, its tensile strength is over 25 tons, and it can be hardened by heat treatment. The casting temperature of this alloy is about 640 degrees Centigrade.

Magnalium.

This is an alloy of aluminium and magnesium. It is much lighter than aluminium and it has a tensile strength of about 20 tons per square inch according to its composition. It is an excellent alloy for castings, these being very clean. It can be soldered and welded, and at certain temperatures it may be forged.

Its specific heat is about .2184 degrees Fah., and the melting point is about 1200 degrees Fah.

Steel.

There are two classes of steel used in the construction of engines—"hard" and "mild."

In order that we may understand the uses and properties of steel it is essential that we should know something about iron. Impure iron, sometimes termed "pig iron," is used as a raw material for the product of iron and steel. Pig iron contains a little more than 1.5 per cent. of carbon. It is very brittle and coarse and it is used, with ordinary scrap iron, in the foundry for all kinds of castings.

Wrought iron is nearly pure iron. It is very tough and of a fibrous nature, and it really consists of small masses of soft iron welded together. It does not contain more than .2 per cent. of carbon, but it contains a certain amount of slag and oxide which is apparent in the form of fibre.

Mild steel is really of the same composition as iron, but it is practically free from slag and oxide. All varieties of iron, except wrought iron, that contain less than 1.5 per cent. of carbon are termed "steel." If the steel contains less than .5 per cent. of carbon it is termed "mild steel," if more, "hard steel." From this it will be seen that the two classes of steel pass gradually into each other, but it is very difficult to determine the exact line of separation.

Very hard steel contains about 1.5 per cent. of carbon. This steel is much too hard for ordinary constructional purposes, and it is chiefly used in the manufacture of keen-edged tools. The grades of steel vary according to the amount of carbon they contain, but, special processes are adopted to produce various qualities for certain purposes.

In the construction of internal combustion engines, steel of all grades is used. Where ball or roller bearings are adopted, special steels, and special methods for hardening, are used.

Some steel is suited for certain purposes if it is hardened by quenching in water, other classes of steel meet the requirements if it is quenched in oil. Again, some classes of steel are entirely satisfactory if they are simply submitted to a blast of cold air.

For the present it may be said that mild steel is used for such items as bolts, nuts, studs, washers, or portions of constructional details that are not subjected to severe wear, strain, or shock.

As far as the actual purposes for which hardened steel is used, this will be dealt with adequately as the design of each part is considered.

(To be continued.)

THE ITALIAN AIRCRAFT INDUSTRY.

Mr. Lorenzo Santoni, who will be remembered as one of the moving spirits in the Deperdussin business in this country and also introducer of the Anzani engine, is now recognised as one of the leading spirits in Italian aviation. It is some time since he established the Savoia aeroplane business, manufacturing machines under Farman licence. This business has been a great success, and as a result the firm is now producing machines of its own type which are said to be highly satisfactory.

Recently Mr. Santoni started a new firm, known as the Societa Idrovolanti Alta Italia, or more familiarly as the S.I.A.I. This firm, which is located at Sesto Calende, is the largest hydro-aeroplane factory in Italy, and is chiefly concerned with the manufacture of flying boats which are largely used by the Italian Navy for work on the Adriatic.

Mr. Santoni is now concerned with the following firms which seem to embrace practically every aeronautical activity with perhaps the sole exception of the actual manufacture of engines:

Societa Generale Imprese Aeronautiche, Via Silvio Pellico N. 12, Milano.

Societa Trasporti Aerei Internazionali, Via Manzoni N. 5, Milano.

Agenzia Generale Forniture Aeronautiche, Societa Anonima, Via Pr. Amedeo N. 11, Milano.

Societa Italo Orientale Emaillite, Via Felice Cavallotti, Musocco, Milano.

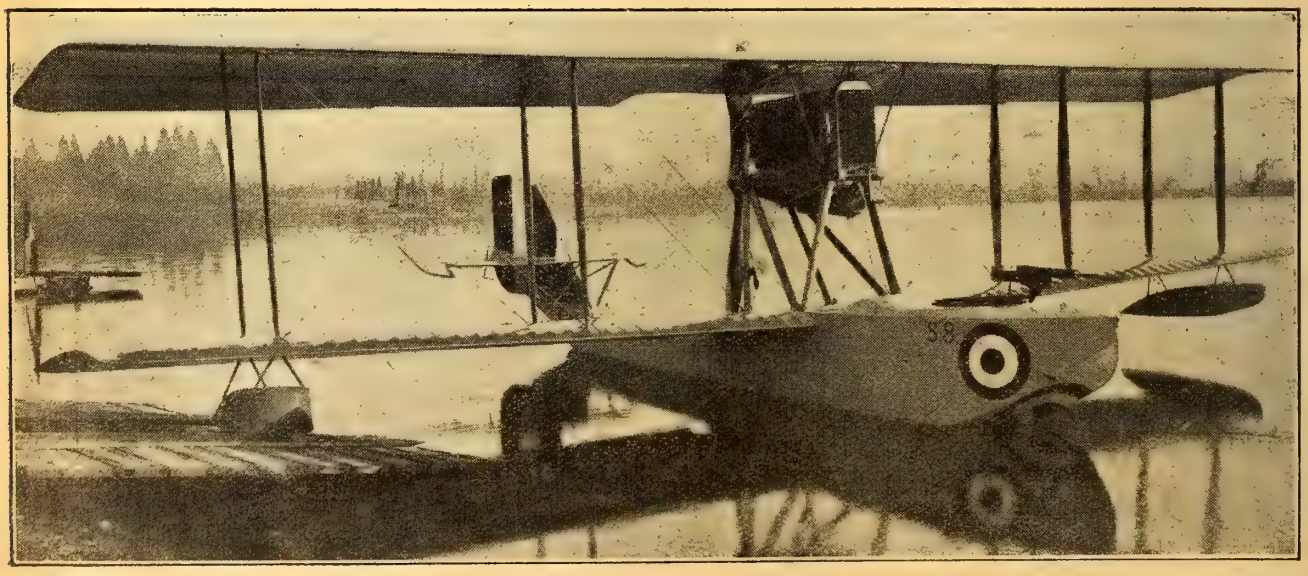
Societa Anonima Costruzioni Aeronautiche "Savoia," Bovisio Mombello, Milano.

Societa Anonima Costruzioni Aeronautiche "Savoia," Ufficio Tecnico, Via Felice Cavallotti, Musocco, Milan.

Societa Generale Industrie Aeriennes—Paris—44, rue Taitbout.

IN MEMORIAM.

Vickers, Ltd., have subscribed £500 for a bed in the Weybridge Hospital in memory of the late Mr. Harold Barnwell.



An S.I.A.I. Flying Boat, Fighter Type, with Gunner in Bows.

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:
30, Regent Street, Piccadilly, S.W.1.
Wire—"Ridleypren Piccy, London."
"Phone—280 Gerrard

Works
5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.
Telephone—Willesden 2346 & 2347.

BRITISH MAGNETO PRODUCTION.

Owing to a misprint in the paragraph at foot of column 2 on page 990 in the issue of The Aeroplane of March 13th an unfortunate error occurred.

The number of Magnetos supplied up to the end of 1917 by the British Magneto Industry was 300,000—not 30,000 as stated. It gives one pleasure to correct the error.

A NEW DISCOVERY IN STEEL.

Particulars are now available of a new hardening method which the inventor of the New Steel has discovered.

Cobaltcrom steel tools treated by this method are proving to have a greatly enhanced staying power in comparison with those treated according to the original instructions. In many cases tests have proved the increased efficiency to be as high as 50 per cent. The operation is so simple and sure that from the hardening point of view the New Steel becomes practically fool-proof.

Normalising is now entirely dispensed with and hardening is effected by one operation only.

Instead of taking tools from the muffle immediately the correct hardening temperature has been attained, the feature of the new treatment is that they should remain in the muffle and be subjected to a slightly falling heat prior to being exposed to natural air cooling.

The inventor of Cobaltcrom steel has worked out an ingenious heat-controlling device which, though the whole outfit only costs a few shillings, is claimed to be more effective and reliable for muffle heat checking than the most expensive pyrometer installation.

The advantage of this device over the ordinary pyrometer system is that both the maximum heat and the falling heat referred to are accurately recorded in the zone of the muffle in which the tool is heated. The device consists of calibrated metallic salts named "Pyreks Heat Indicator Compound," which melt and solidify at definite temperatures, and which are used in combination with small spoon-shaped receptacles made from a patent non-scaling, acid-resisting and rapid heat-conducting alloy (also invented by the originator of Cobaltcrom steel), called "Reactal."

For hardening tools which have to retain keen cutting edges and are not subject to shock 1,000 C "Pyreks" Compound is used, and for tools which are subject to severe shock 900 C "Pyreks" Compound is applied, these two temperatures being the correct treating heats for these classes of tools.

"Pyreks" Compound is also prepared and calibrated for other temperatures.

The hardening instructions are as follows:—The tool to be hardened in the muffle is first heated uniformly to a cherry red. The "Reactal" spoon containing the "Pyreks" Compound is then inserted and placed on or alongside the tool. When the "Pyreks" Compound becomes quite liquid the gas or blast is turned off or, as an alternative, the tool, together with the "Reactal" Spoon, is slightly withdrawn towards the cooler zone at the muffle opening. The "Pyreks" Compound is then watched until it begins to re-solidify, at which point the tool is taken from the muffle and exposed to still air, thus completing the hardening operation.

Shops not possessing a regular muffle can adopt the system with equally satisfactory results by using a smith's hearth and making an improvised muffle by inserting in the coke or coal either a tube closed up at one end or a small plumbago crucible. Further particulars can be obtained from Darwin and Milner, Ltd., or Sybry, Searls, Ltd., Sheffield.



Signor D. Lorenzo Santoni, formerly of the British Deperdussin Co., Ltd., and now one of the leading men of the Italian Aircraft Industry.

MESSES.

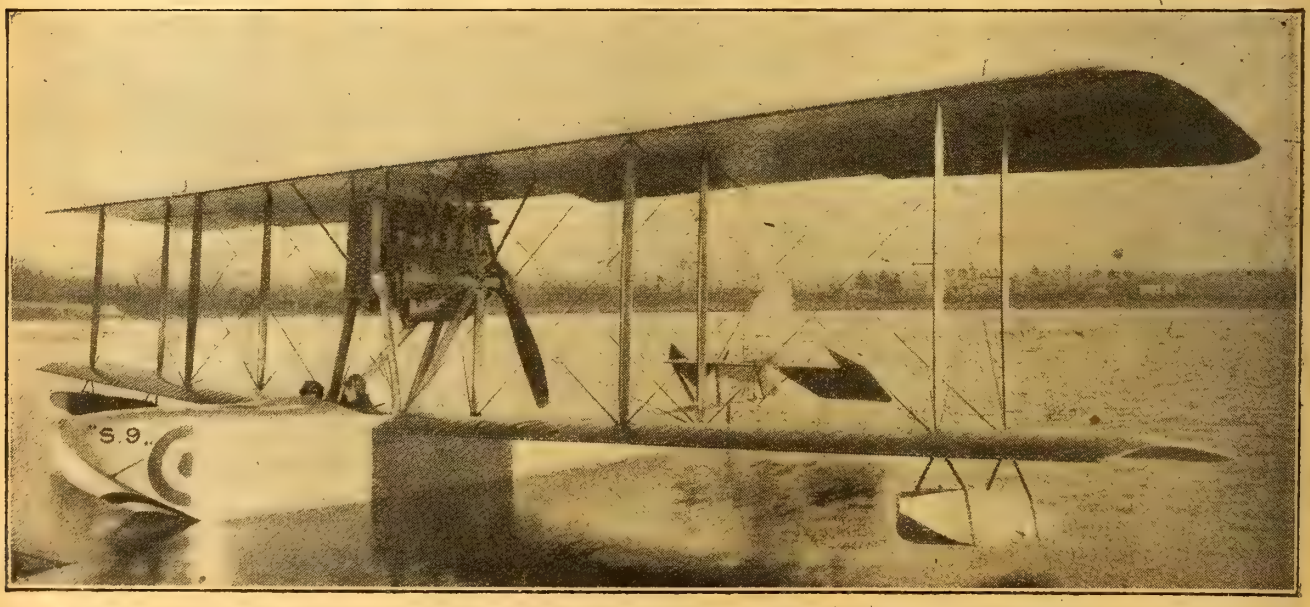
Greenville-on-Sea,
March 14th, 1918.

Dear Sir,—I was very interested to see in your recent issue an illustration of "a typical R.F.C. Mess," and would suggest that you follow this up with a series of other messes, as for instance:—

A typical Air Board Mess.
A typical A.I.D. Mess.
A typical R.A.F. Mu— (I mean Mess), etc., etc.

There are no doubt many other "messes" that you would like to illustrate, but which you dare not owing to Government regulations.

I am, dear Sir, yours most respectfully,
A Constant Reader.



An S.I.A.I. Flying Boat, Reconnaissance Type, with Seats Side by Side.

WE MANUFACTURE

RADIATORS . OIL COOLERS . COWLS . TANKS
MANIFOLDS . EXHAUST BOXES . SPINNINGS
AND AERONAUTICAL SUPPLIES OF ALL KINDS



We have reduced the Radiator Factor to

X

X in this case is not an unknown quantity, but war conditions necessitate us hiding our light under a bushel—except—to Aero constructors employed on Government work.

Our latest radiator supplied to cool the famous **200 h.p.**——engine, weighs only **21 lbs.,** half the usual weight.

This is a commercial proposition and not an experiment. It is produced in large quantities and is the strongest, lightest, and most serviceable radiator yet produced.

WE DELIVER TO AIR COUNCIL ALLOCATION

Our designers and experience are always at our customers' disposal.

GALLAY RADIATOR CO., LTD.,

198, Great Portland Street, London, W.1.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

: IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY

W. CANNING & Co.

Lustre Works, Gt. Hampton Street.

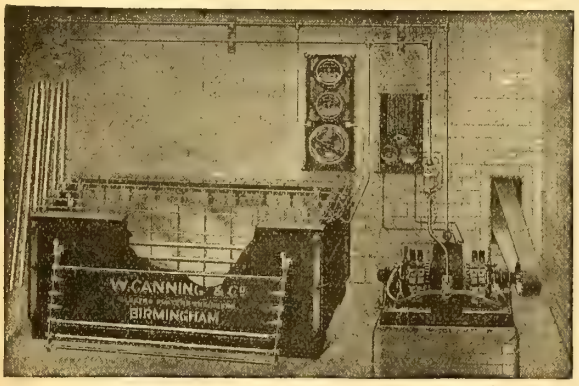
AND 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

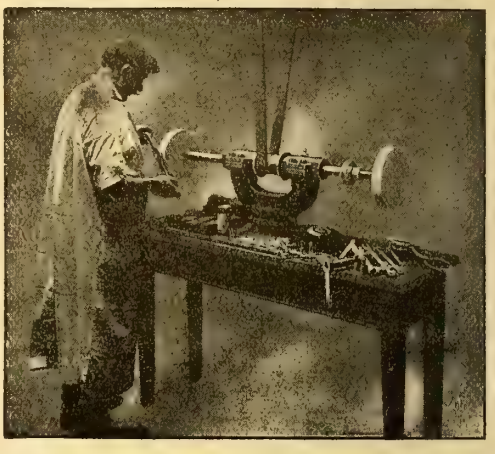


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

The Hollow Structure and Aircraft Co., Ltd., Patent.

WOOD PROBLEM SOLVED.

HOLLOW SPARS

And Struts for all types of machines.

Any length, shape or section without joints.

FULL PARTICULARS FROM THE SOLE LICENSEES,

ROBERT YOUNG'S CONSTRUCTION CO., LTD.,

AIRCRAFT CONTRACTORS,

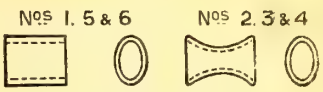
CANONBURY WORKS, ESSEX ROAD, LONDON, N.

TELEPHONE— DALSTON 2985.

TELEGRAMS— BYLDINCONT NORDO LONDON."


SMALL FERRULE. PATTERN "A."

WE CAN SUPPLY THESE AT ONCE



SMALL FERRULES PATTERN "C"

IN VARIOUS GAUGES AND LENGTHS
- SEND FOR FULL PARTICULARS -

FERRULES FOR AIRCRAFT WORK

THE AEROPLANE STEEL TUBE AND PRESSWORK ARTIFICERS


SMALL FERRULE. PATTERN "B."

ACCLES & POLLOCK LIMITED

OLDBURY BIRMINGHAM

Telegrams: "ACCLES," OLDBURY Telephone: OLDBURY 111 (4 lines)
A.B.C. CODE, 5th Ed.


SMALL FERRULE PATTERN "D"

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co Ltd

CONTRACTORS TO H.M. GOVERNMENT.

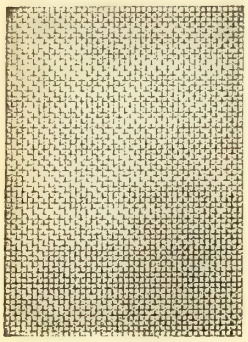
Designers and Manufacturers of all Types of Aircraft for Overland and Oversea Purposes, Flying Boats, etc.

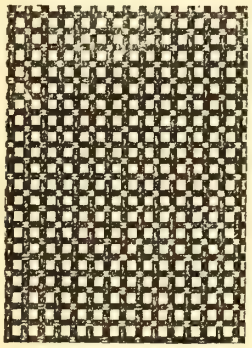
Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

Aviation Works & Offices - 229-231, Hammersmith Road, W.
Engineering Works - - King Street, Hammersmith.
Airscrew Works - Ravenscourt Park, W.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS





AIR BOARD STANDARD PETROL GAUZE—CONTROLLED BY THE AIR BOARD.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY

N. GREENING & SONS, LTD. ESTABLISHED 1799.

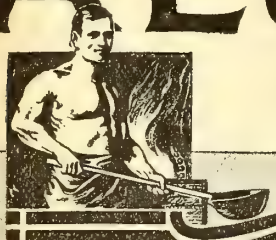
LONDON WAREHOUSE—

16 FINSBURY STREET, E.C.2.

Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No. LONDON WALL 1082.

WORKS - WARRINGTON.

ALUMINIUM CASTINGS





SAND or DIE
of Every Description
2 H.P to 600 H.P
CHILL CASTINGS for AEROPLANES A SPECIALITY
Best Metal. Good Castings. Quick Deliveries
Repairs to Aluminium Crank Cases, Gear Boxes etc., by Special Process

Telephones: 3846 CITY 4879 CENTRAL

Telegrams: KRANKASES ISLINC LONDON

R·W·COAN

The Aluminium Foundry
219, GOSWELL ROAD,
LONDON,
E·C

COAN CASTS CLEAN CRANK CASES

Contractor to H.M GOVERNMENT

NOW IN A POSITION TO EXECUTE ORDERS.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

The "Guardian Angel" Parachutes

THE GUARDIAN ANGEL PARACHUTES
TRADE MARK
(REGISTERED)

THE CLASS OF OUR LIFE-SAVING EQUIPMENT.

The basic characteristics of our Parachutes, which differentiate them from all others, and for which we hold master-patents, are automatic (i.e., compellative) opening, and static and kinetic control (i.e., control at rest and in action) of all their component details. The ordinary parachute is under no sort of control, and what we have accomplished is to convert this most insubordinate Apache of the Air into a staid servitor, incapable of acting in any other than the designed way. We have made the Parachute into an automatic machine, so that failure to open and entanglement of rigging has become a physical impossiblity. Every Type of Parachute made by us possesses these paramount and indispensable principies of machine action. The aviator makes his jump, and the Parachute automatically does the rest.

THE RANGE OF OUR LIFE-SAVING EQUIPMENT.

Life-saving Parachutes for school machines on the Training Grounds.

Life-saving Parachutes for heavy bombing machines, fighters, and scouts.

Life-saving Parachutes with minimum weight and without additional air resistance for the fastest machine that flies, and capable of release from any vertical or horizontal angle, or when flying upside down.

Solo-Parachutes for use from Airships and Observation Balloons, with a high but constant-speed initial drop from a fired gas-bag, automatically opening into the low-speed descent required for a safe landing.

Basket-Parachutes for instantly detaching the basket containing two observers, their instruments and records, from a fired gas-bag, with high-speed initial fall, changing automatically to slow-speed descent for the safe landing. Parachute instantly released on landing, to avoid dragging the basket.

Variable-speed Parachutes, to permit a sudden high-speed drop, controlled by the Parachutist, to escape from an enemy aeroplane, and to stop on any portion of the grade of descent to avoid an objectionable landing. This variable-speed apparatus is applicable to the whole range of our Parachutes.

Non-spinning shock-absorber slings, taking all shocks off Parachute and man.

Aviator's Harness, distributing the stresses over those parts of the body best able to sustain them, and instantly releasable when alighting on land, on a roof, in a tree, or in water.

OUR EQUIPMENT IS THE RESULT OF ENGINEERING SCIENCE APPLIED TO DIFFICULT AIR PROBLEMS. WE BELIEVE THAT ITS EXTENDED USE WILL DOUBLE THE FLYING LIFE OF OUR FIGHTERS AT THE FRONT.

RELIABILITY—First. RELIABILITY—Second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S AERIAL PATENTS, LTD.

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines): London Wall 3266 and 3267. Telegraphic and Cable Address: "Savemalivo-Ave-London."





The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London. Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420
Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 012.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros. Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.
Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships— Wimbledon 1314.

Airships, Ltd., High Street, Merton.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand & Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery, Owen & Co., Darlaston, South Staffs.
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless. Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 01.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300

Clothing—

Burberry's, Ltd., Haymarket S.W.1 Regent 2165
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines)
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728. "Aviduction, Phone, London."
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aeracacons, Canning, London." East 1300.
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1910.
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3996.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654-5-6.
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton." Wolverhampton 98
The Gnôme & Le Rhône Engine Co., Ltd. 47, Victoria Street, S.W. "Elevenfold London." Walthamstow 408 (2 lines)

Electrical Accessories—

Belling & Co., Derby Road Works, Montagu Road, Upper Edmonton, N.18. "Bellin Edmonton." Tottenham 198
Johnson & Phillips, Ltd., Charlton, London S.E.7. "Juno, London." Central 2207, London Wall 156
Mann, Egerton & Co., Ltd., 177, Clevelar Street, London, W.1. "Installing, Euroad, London." Museum 7
Premier Electric Heaters, Ltd., 258, 259, ar 360, Bradford Street, Birmingham. "Farenheit, Birmingham." Midland 68
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.1 "Rodynalite, Phone, London." Willesden 248

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24
Johnson & Phillips, Ltd., Charlton, London S.E.7. "Juno, London." Central 2207, London Wall 156

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester.
Johnson & Phillips, Ltd., Charlton, London S.E.7. "Juno, London." Central 2207, London Wall 156

Electro Platers and Metal Polishers' Engineers—

W. Canning & Co., 133-137, Great Hampton Street, Birmingham. "Materials, Birmingham." Birmingham 3622 Central (3 lines)

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London 3540 Victoria (3 lines)

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 6

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton." Bournemouth 110
Cambridge School of Flying and Aerodrome Co. 308, St. Andrews St., Cambridge, "Cabon, Cambridge." Cambridge 5 and 108

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 61;

Galvanising—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 8
The Rustless Iron (Cowper Coles Process Ltd., 1, French St., Sunbury-on-Thames, Middlesex. Sunbury

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham. "Mosgear, Birmingham."

Glue— East 4

Central Chemicals, Ltd., 283, West End Lane, London, N.W.6. "Entramical, Westhamp London."
Improved Liquid Glues Co., Ltd., Gt. Hermitage Street, E. (Croid.). "Excroide Wapp, London." Avenue 31;
Mendine Co., 8, Arthur Street, E.C. Bank 58;
Oldroyd, Wm., & Sons, Ltd., 9, Mincing Lane

Goggles— E.C

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy London." Regent 13.

Gauges—

J. A. Prestwich & Co., Northumberland Pa Tottenham, N.17.

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 6 Southwark Street, London, S.E.1. "Kinne London." Hop 372 (2 line

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Commercial Wharf, Lambeth, S.E. "Gabrison, Watloo, London." Hop 7
Robert Young's Construction Co., Ltd., Canbury Works, Canonbury Street, Essex R London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery La W.C.2. Holborn 13

Instruments (Scientific, Al meters, etc.)—

The Cambridge Scientific Instrument Co., L Cambridge. "Instrument, Cambridge" Cambridge 6
Short & Mason, Ltd., Macdonald Ro Walthamstow, E.17. "Aneroid, Pho London." Walthamstow

Buyers' Guide.



nine Tools—

yster & Co., 11, Queen Victoria Street, E.C.4. "Circumfuse, Cannon, London." City 768

neto Driving Pieces—

bert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61

netos—

sh Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-1009.

British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicks mag, Phone, London." Museum 430

sson Manufacturing Co. (Berling Magneto), Buffalo, N.Y., U.S.A.

l Manufacturers—

ord, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham." Central 42-43.

ls in General— Avenue 1432

rie, J. B., & Son, 30, St. Mary Axe, E.C.3

& Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 005, 006, and 7006

uel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

l Parts and Fittings—

s & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

aft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 "Upcast, Rand, London" Gerrard 276 (2 lines).

tt & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2207.

iss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.

Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.

kburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

sh Metal (Kingston), Ltd., Kingston-on Thames.

rie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

bard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

n, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston Road, London." Museum 70.

ntford, Fredk., Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261

ertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3996.

ery, Owen, & Co., Darlaston South Staffs.

key, Joseph & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.

Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.

Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. " Selaero, Phone, London." Regent 1181.

Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London " East 1300

Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

mpson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

bler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

al Shearing Tools—

ntgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

al Spinnings—

old & Sons, Standard Works, Lawrence Road, Tottenham, N.15. " Instruments, London." Tottenham 2370-1.

riel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

ric Bolts—

hmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.

bery Owen & Co., Darlaston, South Staffs.

cellaneous—

derson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

wden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

itish Metal (Kingston), Ltd., Kingston-on-Thames.

own Bros, Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethrod, London." London Wall 6300.

rbert Flood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

London Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.

MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston Road, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lin.s).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.

The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London."

Parachutes— Regent 1340.

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemailivo, Ave, London." London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. " Instruments, London." Tottenham 2370-1.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3473

Shackles—

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. " Instruments, London." Tottenham 2370-1.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. " Instruments, London." Tottenham 2370-1.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. " Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1445

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758

Springs—

Dart Spring Co., West Bromwich. "Dart West Bromwich." West Bromwich 322

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61 (3 lines)

Stampings— Avenue 1432

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. " Instruments, London." Tottenham 2370-1.

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3232

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Works Cleveland Street, Mile End, E.1. "Davhur, Phone, London." East 3331 (2 lines)

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.

James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London" Victoria 5073, 4210

Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526

J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.

The Aeroplane Buyers' Guide.

Acceptance and Experimental Flights—
The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London" Gerrard 278 (2 lines).

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Tonmia, Vic, London" Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London" Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol "Aviation, Bristol." Bristol 3966
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Cricklewood, London" Hampstead 3551
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6 "Aviduction, Phone, London." Hampstead 4403 and 4404
Dawson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)
Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne." Eastbourne 1176
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydrophid, Crickle, London" Hampstead 7420
Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London" Regent 612.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48
The Regent Carriage Co., Ltd., 206/132, New King's Road, Fulham, S.W.6. "Carbodys, London" Putney 2240-2241
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuto, East Cowes." Cowes 193
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Jested Phone, London." Regent 378
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston" Kingston 744
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London" City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3 "Vickerfelon, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith, "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 1420
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey" Richmond 1865

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe." High Wycombe 84.

Airships—
Wimbledon 1314
Airships, Ltd., High Street, Merton
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand & Die)
Coan, R. W., 219, Goswell Road, London, E.C.1 "Kranksass, Isling, London" City 2846.

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Pootrs, Fen, London." Avenue 995, 996, and 7006

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1513
Rubery, Owen & Co., Darlaston, South Staffs. The Wiffley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wraitless, Phone, London." City 2681-2
Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd. Redditch "Springs, Redditch" Redditch 61
Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4070
Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3 "Surico, London" Avenue 33 and 35
Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham." Central 1223
Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 1390
London Label Co., Beckton Road, E.16 "Label, Canning, London" East 1300
Clothing—
Burberry's, Ltd., Haymarket, S.W.1 Regent 2165
Dunhill's Ltd., Euston Road, N.W.1 "Dunsend, London" North 3405-6
Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Central Aircraft Co., Palmerston Works, High Rd. Kilburn, N.W.6 Hampstead 4728 "Aviduction, Phone, London"
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond" Richmond 1681
The Aircraft Construction Co., Harley Works, Beckton Road, E.16 "Aeroreons, Canning, London" East 1300
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England "Thompson Bros., Bilston" Bilston 10
Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115
Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London" Gerrard 2312
British Cellulose Co., 8, Waterloo Place, S.W.1 "Cellulate, London." Regent 4046
The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 289
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London" London Wall 5339 3622
Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand" Regent 3923
Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford." Bedford No. 1
Arrol-Johnston, Ltd., Dumfries "Dear, Dumfries." Dumfries 281-282
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2 Hampstead 3009
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1. "Aerofight, Vic, London" Vic 7026
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge" Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith" Hammersmith 1010
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3996.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London" Gerrard 1634-5-6.
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton
The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Ldtr, London" Walthamstow 458
Electrical Accessories—
Belling & Co., Derby Road Works, Mere Road, Upper Edmonton, N.18 "Belling, Edmonton" Tottenham
Johnson & Phillips, Ltd., Charlton Lever, S.E.7 "Juno, London" Central 2207, London Wall
Mann, Egerton & Co., Ltd., 122, Clarendon Street, London, W.1 "Jas. Peg, road, London." Museum
Premier Electric Heaters, Ltd., 258, 349, 360, Bradford Street, Birmingham "Premheat, Birmingham" Midland
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W. "Rodynalite, Phone, London" Willesden
Electric Cables—
E. Kalker & Co., Coventry "Kalker, Coventry" Coventry
Johnson & Phillips, Ltd., Charlton Lever, S.E.7 "Juno, London" Central 2207, London Wall
Electric Lighting and Power—
E. Stanley Jordan, M.M.I.E.E., 57, Sidney Mansions, Johnson & Phillips, Ltd., Charlton Lever, S.E.7 "Juno, London" Central 2207, London Wall
Electro Platers and Metal Polishers' Engineers—
W. Canning & Co., 133-137, Great Hampton Street, Birmingham "Metcans, Birmingham" Birmingham 3622 Central
Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).
Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch Springs, Redditch" Redditch
Flying Schools—
Bournemouth Aviation Co., Ltd., Tube Lge, Bournemouth "Etches, Winton, Bournemouth" Bournemouth
Cambridge School of Flying and Aerodrome, 308, St. Andrews St., Cambridge. "Cambridge, Cambridge" Cambridge
Furniture (Office)—
Cooke's (Lansbury), Ltd., Lansbury Furniture House, London, E.C. London Wall 573
Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich" Norwich
The Rustless Iron (Cowper Coles Process), Ltd., 1, French St., Sunbury on-Thames, Middlesex. Sunbury
Gears—
Moss Gear Co., Ltd., Thomas Street, Birmingham "Mossgear, Birmingham" Birmingham
Glue—
Central Chemicals, Ltd., 283, West End Lane, London, N.W.6. "Entecanical, West, London."
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London" London Wall 5339 3622
Improved Liquid Glues Co., Ltd., Glue Cottage Street, E. (Croid). "Icecroid, Wapp, London." Avenue
Menzline Co., 8, Arthur Street, E.C. Basic
Oldroyd, Wm., & Sons, Ltd., 9, Mincing
Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterles, London." Regent
Gauges—
J. A. Prestwich & Co., Northumberland Tottenham, N.17.
Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65, Southwark Street, London, S.E.1 "London" Hop 372
Hollow Spars—
McGruer Bentwood Hollow Spar Co., mercial Wharf, Lambeth, S.E. son, Watloo, London."
Robert Young's Construction Co., Ltd., bury Works, Canonbury Street, London, N.1
Instruments—
British Wright Co., Ltd., 33, Chancery, W.C.2
Instruments (Scientific, meters, etc.)—
The Cambridge Scientific Instrument Co., Cambridge. "Instrument, Cambridge" Cambridge
Short & Mason, Ltd., Walthamstow, E.17. "Aeroid, London." Walthamstow

Machine Tools—
Brewster & Co., 11, Queen Victoria Street, E.C.4 "Circumfuse, Cannon London" City 768
Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61
Magnetos—
British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.
The M-L Magneto Syndicate, Ltd., Victoria Works, Coventry "Cortion, Coventry" Coventry 1008 1009
The British Lighting & Ignition Co., Ltd., 304, Tottenham Court Road, W.1. "Vicks, Piccy, Phone, London" Museum 433
Ericsson Manufacturing Co. (Berling Magneto), Buffalo, N.Y., U.S.A.
Metal Manufacturers—
Clifford, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham" Central 42-43
Metals in General—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 "Velis, Fen, London" Avenue 995, 996, 7006
Mercer & Co., 108, Upper Thames Street, E.C.4 "Reconcited, Cannon London" City 6342
Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Aircraft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 "Upcast, Rand, London" Gerrard 5756 (2 lines)
Arnott & Harrison Ltd., Hythe Road, Willesden Junction Willesden
Baylis, Jones & Baylis, Ltd., Wolverhampton (Bolts and Nuts) "Baylisa, Wolverhampton" Wolverhampton 1041
The Birmingham Guild, Ltd., 45, Great Charles Street, Birmingham "Handicraft" Central 3703
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (4 lines)
British Metal (Kingston), Ltd., Kingston-on-Thames
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Lombard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham" Midland 211 (2 lines).
Mann, Egerton & Co., Ltd., 122, Cleveland Street, London, W.1 "Installing, Lusroad, London" Museum 70.
Mountford, Fredk., Ltd., Fremo Works, Lilford, Birmingham "Fremo, Birmingham" Kings Norton 261
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3996
Rubery, Owen, & Co., Darlaston, South Staffs.
Sankey, Joseph & Sons, Ltd., Wellington, Shropshire "Sankey, Wellington, Salop" Wellington 66
The Pulsometer Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulsipalt, Phone, London" Holborn 410
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aeroreons, Canning, London" East 1300
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rodynalite, Phone, London" Willesden 2480.
Thompson Bros., Ltd., Bradley, Bilston "Thompson Bros., Bilston" Bilston 10.
Wooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.
Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol "Ingenuis, Saltford" Keynsham 21.
Metal Spinnings—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham." Central 1223.
Metric Bolts—
Cushmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery, Owen & Co., Darlaston, South Staffs.
Miscellaneous—
Anderson, D., & Son, Ltd. (Roofs), Belfast "Anderson, Belfast" Belfast 4033-4034-4035.
Bowden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London."
British Metal (Kingston), Ltd., Kingston-on-Thames. Willesden 2400 (3 lines).
Brown Bros., Ltd., Great Eastern Street, E.C.1 "Inbrowned, Bethrood, London" London Wall 6800.
Herbert Frood Co., Ltd., Chapel-en-le-Frith "Frodobrake, Birmingham." Central 793.
London Label Co., Ltd., Harley Works, Beckton Road, E.16 "Nonflamoid" Nonflammable Celluloid. "Londabel Canning, London" East 1300
MacLennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Threads City 3115
Motor Cars—
Arrol-Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282
Mann, Egerton & Co., Ltd., 379-381, Euston road, London, N.W.1. "Manageur, Lusroad, London" Museum 70
Standard Motor Car Co., Coventry "Standard, Coventry" Coventry 530 (4 lines)
Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston-on-Thames
The Craig Metal Engraving Co., Chatsworth Works, Worthing "Craig, Worthing"
Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterles, Piccy, London" Regent 3340
Parachutes—
E. R. Calthrops Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London" London Wall 3206 3207
Pattern Making—
Fredk. Ward, 6, 7 and 8, Ilsop Street, Upper Baker Street, W. Paddington 4743
Piston Rings—
British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 523
Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London" Tottenham 2370-1.
Power Presses and Dies—
Bliss E. W., & Co., 21, Pocock Street, Blackfriars Road, London, S.E.1 "Blisseln, London" Hop 4312
Presswork—
Rubery Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch, "Springs, Redditch" Redditch 61
Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (4 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich, "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Ebora, Kingston" Kingston 652
Integral Propeller Co., Ltd., "Airprop, Hyde, London" Hendon 9 Kingsway 164
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge" Weybridge 520-521
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines)
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 201, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129
Pyrometers—
The Foster Instrument Co., Letchworth, Herts. Foster Instruments Letchworth Letchworth 26
Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England "Cradock, Wakefield" Wakefield 466
Rubber Tubing & Accessories—
Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1 "Masticator, Isling, London" City 3811 and 3812
Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester "Semloh, Manchester" City 4432
Screw-driving Machines—
Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.
Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines)
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor" Bognor 48
Short Bros., Rochester. "Seaplanes, Rochester" Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.
Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rodynalite, Phone, London" Willesden 2480.
Seats for Aeroplanes—
Bowser, L., Art Cane Works, 50, Park Lane, Leeds Central 3473
Shackles—
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rodynalite, Phone, London" Willesden 2480.
Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London" Tottenham 2370-1.
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345
W. H. Bristoe & Co., Ltd., 51, Rose Park Street, Birmingham "Brisk, Birmingham" Central 552
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham." Central 1223
London Aluminium Co., Ltd., West Gate Road, Aston, Birmingham East 497
Rubery Owen & Co., Darlaston, South Staffs.
Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Tonmia, Vic, London" Victoria 4830.
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London" Tottenham 2370-1.
British Metal (Kingston), Ltd., Kingston-on-Thames
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Tonmia, Vic, London" Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London" Regent 1181.
Arthur Hall & Co., Silk Store Road, Nottingham, W. Nottingham
Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223
Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 222
Ripault, Leo & Co., Ltd. (Oleo Plugs), 641, Fulham Palace Road, W.6 "Ripault, Reg, London" Gerrard 7778
Springs—
Dart Spring Co., West Bromwich. "Dart, West Bromwich" West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61
Stampings—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London" Tottenham 2370-1.
Steel—
Firth, Thos., & Sons, Sheffield "Firth, Sheffield." Sheffield 3240
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Sidcup Bearing & Co., Birmingham "Bronco, Birmingham" Smethwick 224
Steel Stamps and Markings—
John Meerloo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Dashur, Phone, London." East 3331 (2 lines)
Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lilford, Birmingham "Fremo, Birmingham" Kings Norton 261-262
Tapes and Smallwares—
MacLennan, John & Co., 30, Newgate Street, E.C.1, and at Glasgow City 3115
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471
Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Enilkosil, Vic, London" Victoria 5073, 4210
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton" Nottingham 1226
J. Owen & Sons, Ltd., 1992, Borough High Street, S.E.1. "Bucheron, London" Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark, R. Ingham & Co., Walter House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1472
Herbert Terry & Sons, Ltd Redditch "Springs, Redditch." Redditch 61

Vices—
C. and J. Hampton, Ltd., Sheffield "Vices Sheffield" Attercliffe 95

Watchmakers and Jewellers
(Silver Models)—
Goldsmiths & Silversmiths' Co., Ltd., 112, Regent Street, W.1 Gerrard 9001 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines)

Welding Repairs—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg. London." Gerrard 8173
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines)

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Picc, London." Regent 1340

London Label Co., Ltd., Hadley Works, Beckton Road, E.16 "Nonflamoid" Nonflammable Celluloid. "Lonlabel, Canning Town, London" East 130

Wire Gauze—
N. Greening & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 108
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C. Avenue 1432

Wires and Cables (Aeroplanes)—
Bruntons, Musselburgh, Scotland "Wiremill, Musselburgh." Musselburgh
Cradock, Geo., & Co., Ltd., Wakefield, England "Cradock, Wakefield." Wakefield (3 lines)

Wirework—
Terry Herbert & Sons, Ltd., Redditch "Springs, Redditch" Reddit

Wood Refuse Suction Gas Producers—
Ruston Proctor & Co., Ltd., Lincoln, England "Ruston, Lincoln." Lincoln 58

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale" Rochdale 46
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 13
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 161

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.G.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

Telephone: 1153 and 1154, KINGSTON. Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

TWO COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

Addresses of our fine Saw Mills, Works, etc., — have been camouflaged by the Censor. —

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS, — STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

SAMUEL MERCER & CO.,

Telegrams Reconciled Cannon, London

Proprietor—S. T. MERCER.

Telephone: City 6342.



Metals **for Aircraft.**

MILD STEEL SHEETS
SPECN. S3 & 9A.
Passed & Stamped A.I.D.

BEST CHARCOAL TINNED & LEAD COATED.

BLACK C/R and C/A SHEETS.

GALVD. SHEETS.

BRASS AND COPPER SHEETS.

SOLDER. INGOT TIN.

WELDING WIRE.

COPPER BITS, ETC.

LARGE STOCKS IN OUR OWN WAREHOUSE.

Immediate **Deliveries.**

Manufacturers of Solder *for all purposes.*

198, UPPER THAMES ST., LONDON, E.C.4.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

OFFICE AND WORKS—

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE 3 LINES—
WILLESDEN 2455

TELEGRAMS—
NIEUSCCUT, CRICKLE, LONDON

WYCOMBE AIRCRAFT CONSTRUCTORS, Limited.

HIGH WYCOMBE,

BUCKS.

Telephones: High Wycombe 84 (Stores: High Wycombe 120).
Telegrams: "Aircraft, High Wycombe."

INCREASED OUTPUT
DEMANDS
GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

The Wilfley Company, Limited
SALISBURY HOUSE, LONDON WALL, E.C. 2.

Telegrams: "Wrathless, Phone, London." Telephones: City 2681 & 2682.

How 2 tons of Steel were saved from the scrap heap.

The illustration below shows six hundred sliding shafts—the square at the driving end of each had become so worn by constant hard work as to render the shafts of no further use. Not so long ago they would have been described as worn out, and new ones procured. But to-day every scrap of chrome nickel steel is required for actual munitions, and the steel for the job, which had a fairly high priority classification, could not be obtained.



THE NEW WELDING CO.

were approached, and undertook the task of supplying the firm concerned with equivalent to six hundred new shafts, the difference being that no new steel was required and the expense was a fraction of what new shafts would have cost.

Each of the four sides of square was built up, and afterwards re-machined and case-hardened.

THE NEW WELDING CO.,
26, Rosebery Avenue,
LONDON, E.C.1.

Telephone; 5252 Holborn.
Telegrams; "Windoneeda, Holb. London."

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

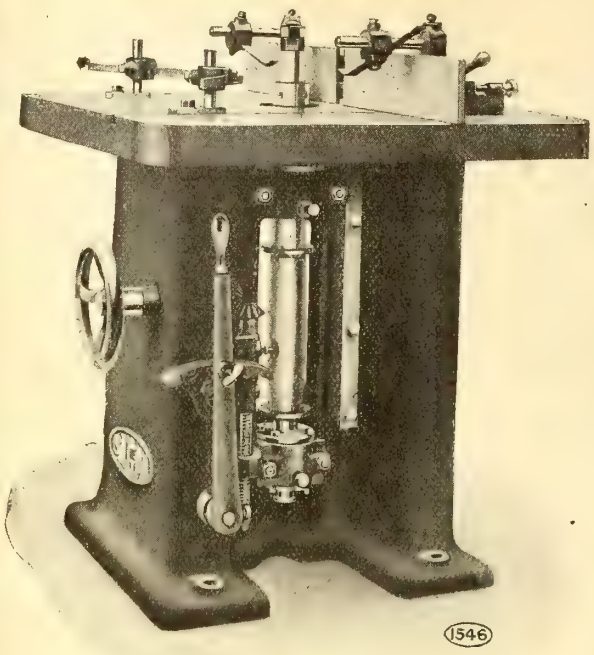
Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome
and
The GRAHAME-WHITE School of Flying.

Telegrams:
VOLPLANE, HYDE, LONDON.

Telephone:
Kingsbury 120 (5 lines).



SAGAR

THIS ILLUSTRATION shows

OUR LATEST TYPE

Heavy Single Spindle Moulding and Shaping Machine

Spindle is exactly central with main Frame in all directions, and revolves in ROLLER BEARINGS.

Several other new features.

Fuller Particulars on request.

We make a complete line of Woodworking Tools for Motor Body Builders, Aircraft Constructors, etc., and shall be pleased to send full particulars of our manufactures to any one interested.

J. Sagar & Co., Ltd., Saw Mill Engineers, Canal Works, **Halifax,** Eng

LONDON OFFICE: 60, WATLING STREET, E.C.

Contractors to H.M. Admiralty, War Office and Foreign Governments

The BRITISH CAUDRON CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office and Works:

BROADWAY, CRICKLEWOOD, N.W 2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 4647 4648 HAMPSTEAD

Scottish Factory and Aerodrome:

ALLOA.

Cable and Telegraphic Address: "CAUDROPLAN, ALLOA." Phone: 52

Sterling

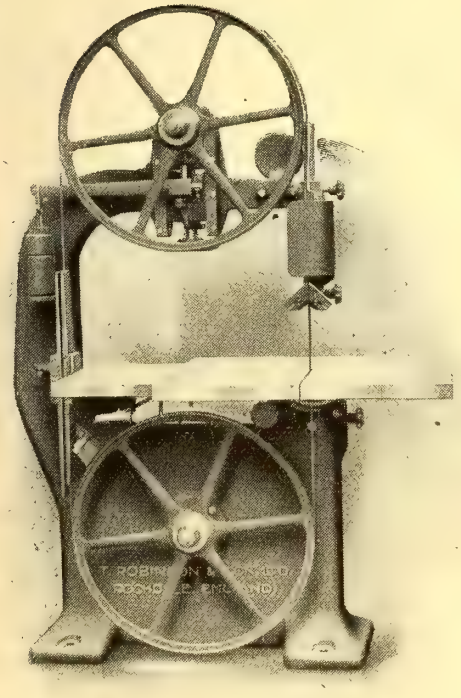
CASTINGS

IT is when it comes to rejects after a number of operations in your machine shop that you know what is the real cost of the castings you use. If you use "Sterling" Castings the number of rejects and the sums paid for wages which are wasted thereon are reduced ——— to the lowest limits. ———

Sterling Metals, Ltd:
Coventry.
WIRE: 'STERMET' COVENTRY
PHONE: COVENTRY 881

THOMAS ROBINSON & SON, LTD.

ROCHDALE, ENG.



Band Sawing Machines
FOR AIRCRAFT
AND OTHER
HIGH-CLASS WORK.

SPECIAL FEATURES:

Saw Pulleys mounted in **Ball Bearings.**

Patent Straining Device which prevents breakage of Saws.

High Speed with accurate sawing.

Type NO—30in. SAW PULLEYS.
Type NU—36in. SAW PULLEYS.

Write for particulars.

CELLON

(NON-POISONOUS)

DOPE

CELLON LTD.,

BROAD STREET HOUSE, E.C.2.

Telegrams—"AJAWB," LONDON. Telephones—LONDON WALL, 5359, 3622,

Contractors to H.M. Government.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

A Method of Approximating the Static Thrust and Brake Horse-power of Air Propellers.

BY W. BERNARD MURPHY.

Since data as to methods of approximating static thrust of propellers are very meagre and as many people seem content with results that may be 20 per cent. from the actual figures, also ignoring the variable element of blade widths, a very important factor, a more suitable method is obviously necessary. Therefore I wish to call your readers' attention to the Laws of Airscrews discovered by W. R. Turnbull, A.F.Ae.S.

From these laws the Static Thrust and the Brake Horse-Power (on the ground) of any propeller can easily be determined within 5 per cent. of the actual values.

These laws were first published in the "Aeronautical Journal" of October, 1910, and were confirmed later by Riabouchinsky, Eiffel and others. They must not be confused with "Two Fundamental Laws of Aerodynamics," also discovered by Turnbull and published in the same journal in January, 1912.

Briefly stated, Turnbull's laws of airscrews are represented by the two formulæ :—

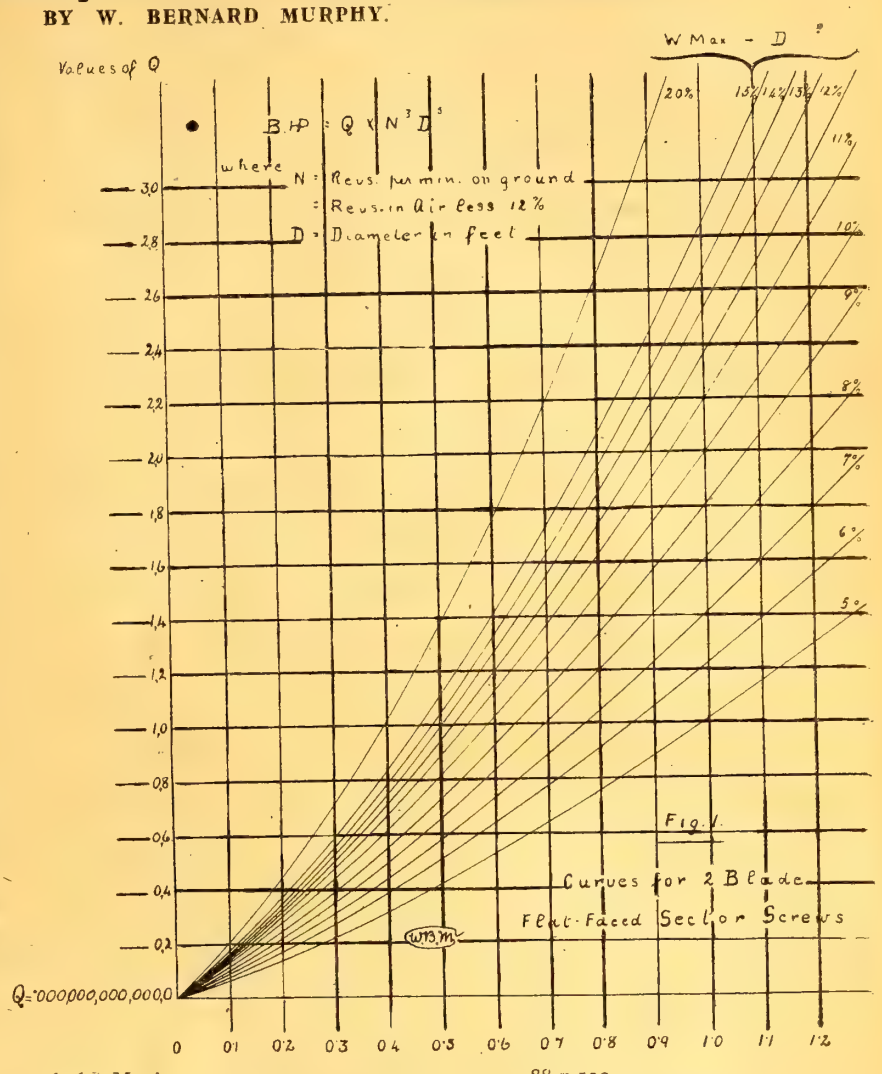
$$T = U\ R^2\ D^4.$$

and $$P = Q\ R^3\ D^5.$$

*in which T = Static Thrust in lbs.
P = B.H.P. (Absorbed by propeller revolving with no forward motion).
R = Revolutions per minute.
D = Diameter of the screw in feet.
p = Pitch of the screw in feet.

The co-efficients U and Q are variable, depending on the units employed and the relation of the Pitch (p) to the Diameter (D).

By using Turnbull's curves and substituting for the known quantities it is possible to determine quite accurately both the Static Thrust and the Horse-power absorbed. I reproduce the curves herewith so as to show how they may be applied to concrete cases.



It is assumed that the Brake Horse-power and the Maximum Revolutions per minute obtained in the air are known. Also, that the diameter, maximum blade-width and the ratio of the pitch to the diameter of the airscrew have been chosen. As the revolutions on the ground are always less than those obtained in the air by about 12 per cent. the necessary deduction must be made to obtain accurate results.

To take an actual example, let us assume that the engine to be used gives 100 B.H.P. at 1,250 revolutions per minute in the air. A maximum velocity of 100 m.p.h. is to be attained and the diameter of the airscrew is to be 9 feet.

With the use of the curves, Figs. 1 and 2, and the above-mentioned formulæ, the Static Thrust, and Maximum blade-width are first determined in the following manner :—

Maximum revolutions less 12 per cent. = 1,100 revs. per min. on ground.

From the B.H.P. curves supplied by the engine makers the brake horse-power delivered at 1,100 revs. per min. is obtained, we will assume it to be 93 B.H.P.

Substituting for the formula :—

$$P = Q \times 1100^3 \times 9^5$$

we obtain

$$93 = Q \times 1100^3 \times 9^5$$

from which

$$Q = 0.000,000,000,001,184.$$

We must now determine the ratio of p/D from the air-speed of the machine assumed in this case to be V = 100 m.p.h.

We can obtain this from the formula for pitch, viz. :—

$$p = \frac{88\ V}{R}$$

or in the case assumed $p = \frac{88 \times 100}{1250} = 7.05$ feet.†

$$\therefore\ p/D = \frac{7.05}{9} = 0.783.$$

We now have the ratio p/D and a value for Q, and if we enter the curves, Fig. 1, we find the maximum width (W. Max.) of a sector-screw to be 8.1 per cent. of the diameter, or 8.1 per cent. of 9 feet = 0.728 feet = 8.75 inches.

Having now determined our W. Max. for the conditions assumed, we can now turn to the curves on Fig. 2, and with this value and the value of p/D already found, find the corresponding value of U to be 0.000,000,059,5.

We may now by direct substitution in Formula 1 obtain the Static Thrust as follows :—

$$T \text{ in lbs.} = U \times R^2 \times D^4$$
$$= 0.000,000,059,5 \times 1100^2 \times 9^4$$
$$= 472 \text{ lbs.}$$

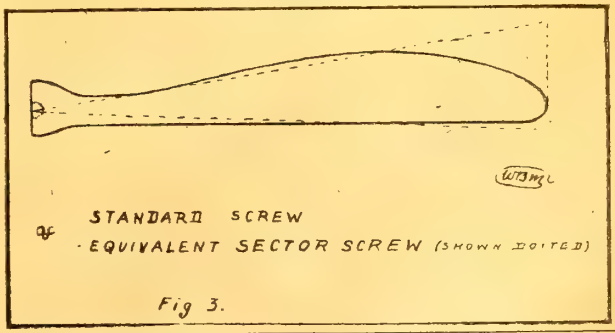


Fig. 3.

* These laws can be used with any units of time, weight, power, etc., not necessarily the English Units.

† This is the effective pitch, and for a strict consideration of the case the pitch due to the angle of attack must be added, but this is not necessary for approximate results.

This gives a close approximation for 2-bladed airscrews of sector shape having a flat face, but if it is desired to obtain a similar result for the more modern shaped screws, say, having a curved leading edge and a straight trailing edge, with the maximum blade width at about 2/3 radius of the screw, it is necessary to introduce some modifications as found by Turnbull from large-sized screws of this type.

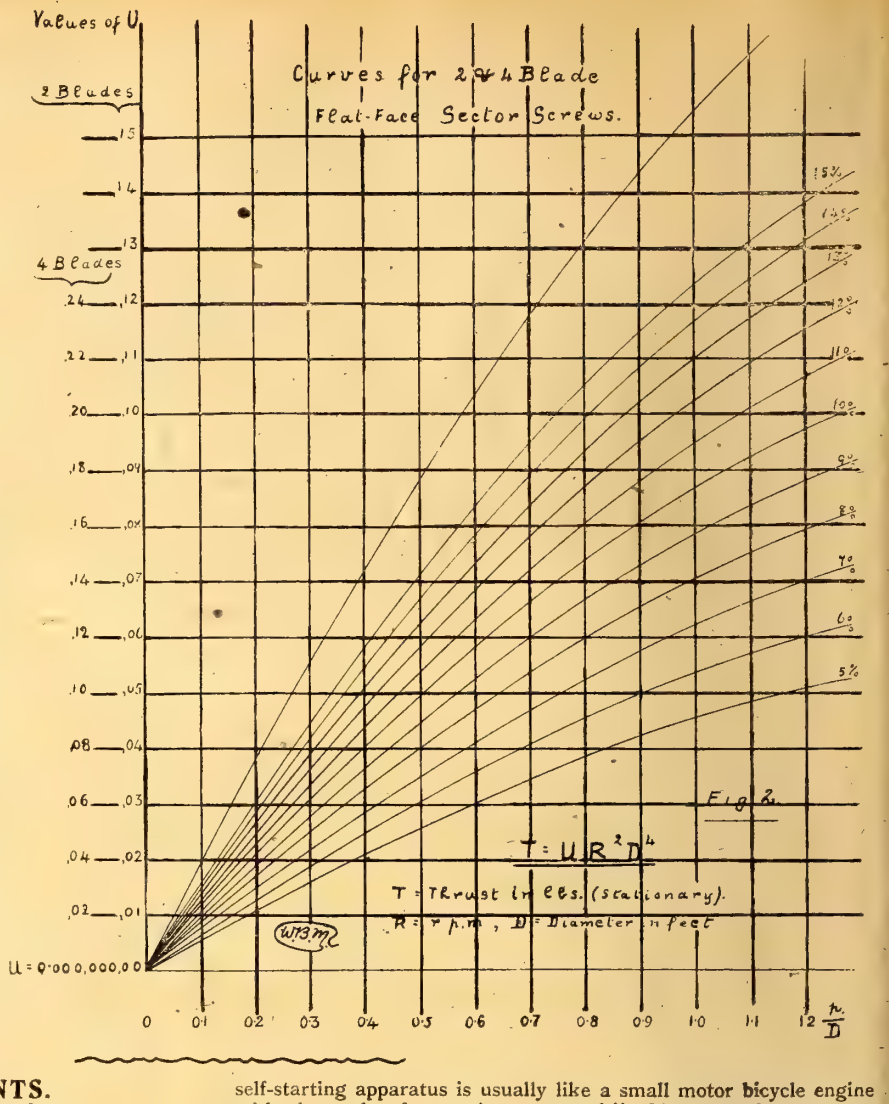
For approximate results all that is necessary is to multiply the value of the maximum width (Sector Screw values) by 1.135.

In Fig. 3 is shown the difference between Sector Screws and Standard Screws. It will be noticed that the maximum width of the former is at the blade tips, while of the latter is at 2/3 of the radius. Insufficient attention has been paid to the fact that where a large horse-power has to be absorbed by an airscrew of restricted diameter the Sector Screw is the more useful. But where the diameter is not restricted the Standard Screw is more efficient, owing to the diminution of the blade-tip losses.

I have to thank Mr. Turnbull, the discoverer of these laws, for his kind permission to publish them. Unfortunately, many of the more modern designers, having at hand the latest aerofoil data and the results of numerous actual experiments, evolve their propellers by empirical formulæ which, in some cases, show little knowledge of the actual aerodynamics concerned.

It is to be regretted that the originator of these and the other laws mentioned does not republish his old works with the addition of his more modern data in a suitable volume, which would be of immense value to the many aeronautical engineers at present trying to obtain knowledge.

It will, of course, be remembered that the recent world's height record for seaplanes was established by the aid of a Turnbull propeller.



FOR DULL MOMENTS.

There has arrived at this office "for favour of review," a booklet, which describes itself as "A Glossary of Aeronautical Words and Phrases," apparently compiled by a Mr. H. J. Stevens. The frontispiece to this work is a more-or-less reproduction of a photograph of Sir William Weir, apparently at the age of about nineteen.

One notices in the table of contents that the name of the Albatros biplane is twice wrongly spelt, and that it is thereafter wrongly spelt in the pages to which the table of contents refers. On one of these pages the interesting statement is made that the Austrian-Hansa-Brandenburg is a development of the said Albatros. It would be interesting to know how this curious mongrel was produced, seeing that the Hansa firm is a definitely German firm, which has no alliance with the Albatros. One imagines that the perpetrator of this statement has been reading "All the World's Aircraft," and has misunderstood the statement that "the chief designer of Hansa and Brandenburgische Flugzeugwerke is Engineer Director Hunkel, formerly of the Albatros firm, who has brought out the 160 h.p. Mércèdes engined tractor biplane, on which the Austrian chief pilot of the company, Reiterer, put up various altitude record flights."

In various parts of the book there are illustrations and sketches of German aeroplanes and also of a few unimportant American machines, but it is interesting to notice that so far as this "glossary" is concerned not one single British aeroplane is so much as mentioned. In which connection it is really amusing to find a full-page advertisement of the publishers of the glossary themselves, in which they refer to one of their publications "as the journal that educates."

Turning to the actual "glossary," one finds among the more simple words that "Aerostatics" is "the science of equilibrium in the air." In plain fact, the equilibrium of aeroplanes in the air is distinctly a matter of aerodynamics.

One is also told that an "Airman" is "a person skilled in the control of aircraft." If this were true one imagines that the number of crashes in the Flying Services would be considerably less in number

Alongside "Air Pump" it is stated that "an air pump for self-starting apparatus is usually like a small motor bicycle engine with the cycle of operations reversed." If anyone has seen an air pump like this the Editor of The Aeroplane would be delighted to describe it at length.

After "Airships, British," one finds that "the 'Mayfly' was the first British attempt at a rigid airship. The types include 'Beta,' 'Gamma,' 'Delta,'" etc. It will be news to most people that these were rigid airships.

"Albatross" is given as "German seaplane named after the sea-bird albatross," and this despite the fact that the Albatros biplanes illustrated elsewhere in the book are all land machines.

'Aspect Ratio" is given as "the ratio of two dimensions (in any given aspect) of a flier." For instance, one supposes, the ratio of the hat band to the waist measurement of a pilot.

"Ballonet" is given as "a word taken from the French, meaning 'a little balloon,' and exclusively limited to an interior bag containing gas within the envelope of an airship." One is under the impression that the ballonet of most airships contains air, for the purpose of preserving the distention of the envelope.

"B.H.P." is given as "Brake horse power as taken off an engine or machine by a brake attached thereto. The instrument used is a friction dynamometer." One seems to have heard of calibrated fan-brakes and of water dynamometers.

"Box Girder" is described as "Girder in which plates are bolted together in box form, to give strength without great weight." Presumably, then, the cellule of a biplane or the fuselage of an aeroplane is not a box girder, though one confesses to being under the impression that it is so.

This only brings us to the letter C, and unfortunately it is impossible to review the rest of the alleged glossary. As a humorous work the publication is not without value. A number of drawings are included, taken from that excellent American paper, "Aircraft," but there is nothing to indicate that they are of American origin, and one is left with the impression that they are original drawings made for the publishers of the glossary itself. Those who wish to beguile a dull moment with the errors of the glossarist can obtain a copy for 1s. 3d. post free, from the Rolls House Publishing Co., Ltd., 2, Bream's Buildings, E.C.4, but one does not recommend that the publication should be taken seriously.

AIRCRAFT MANUFACTURING COMPANY LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

Offices & Works
HENDON, N.W.9.

TRADE MARK
ASCOL
REGISTERED.

You can have delivery of any of these "Ascol" Specialities NOW

"ASCOL" LEAFLETS. We have now ready a large range of illustrated leaflets dealing with "Ascol" Specialities. These include "Ascol" Micrometers, Factory Stools, File Cleaners, Avro Parts (Washers and Eyebolts), Safety Belts, Dope Brushes, etc., etc. The leaflets are supplied in a neat and useful case, and will be sent free to the Industry upon application on business stationery.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.
Head Offices, Showrooms, and Stores:
ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.
Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

Works:
Little James St.
London, W.C.1.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Telephone:
Gerrard 276.
(*Private Branch Exchange.*

MANAGING DIRECTOR .. .. .. G. H. MANSFIELD.



"ASCOL" MICRO-METER
30/- and **32/6** each.



"ASCOL" FILE HANDLES.
2½ in. **3/-**, 3½in **3/6** per dozen.

BRUSHES.



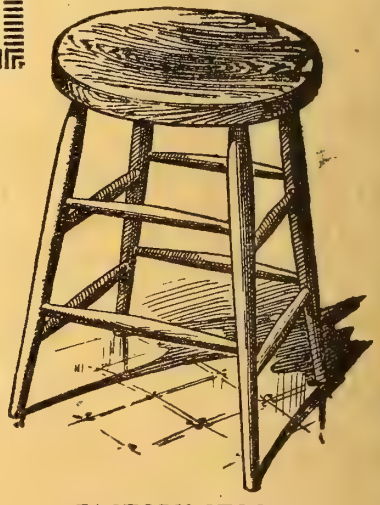
4-row Scratch Brushing (for Burnishing), **16/-** per doz.



Engine Brushes. **8/6** and **9/6** per dozen.



Mop Brush, **4/2** per dozen.



FACTORY STOOLS (Wood).
24in. high - **6/6** each.

THE AIRCRAFT TRADER

Commercial Aviation—A Snag.

BY H. F. SMALMAN-SMITH.

In a recent interesting discourse Lt.-Col. Mervyn O'Gorman, in treating generally of conditions preliminary to the development of commercial air transport, suggests as a basis of international air traffic agreements between friendly Powers for the mutual concession of alighting rights and the laying down of fixed routes to be followed. In dealing with this branch of his subject, however, the speaker omitted any reference to a point which must certainly emerge into prominence in a manner impossible of neglect, i.e., the new facilities afforded by the development of aerial traffic for the introduction into this country of merchandise subject to import duties and the successful evasion of the latter.

The problem presented to the authorities in this connection is of primary importance not only by reason of the fact that its effectual solution is essential to the preservation of a vital source of national revenue, but further, that, unless adequately and seriously dealt with from the outset, *it may become the root cause of that official meddling and oppression* feared and deprecated by Lt.-Col. O'Gorman—a possibility which no one interested in the unfettered development of Aviation and the Aircraft Industry can disregard. A cursory examination of some aspects of the position may not therefore be found inopportune.

There are already abundant indications that with any return to a normal economic régime both the prime and running costs of aircraft will very rapidly be brought within limits calculated to give transport by air in the ordinary way of commerce a sufficient measure of advantage to warrant its adoption. Under such conditions it is obvious that the introduction of commodities moderate in weight and bulk and subject to heavy import duties will offer considerable attractions to unscrupulous adventurers whenever the profit likely to be earned is in any large measure in excess of running cost, and, failing the organisation of adequate means for the control of incoming aerial traffic, it is beyond all reasonable doubt that such a form of smuggling will become as popular as it may be lucrative.

It may be presumed that, following the conclusion of peace, the ban on civilian flying will remain until such international agreements as those foreshadowed by Lt.-Col. O'Gorman have been concluded. Their essential necessity as an initial step in the transition from military to commercial conditions is self-evident. It is equally clear, however, that the effective utility of such conventions, however wide their scope, must be restricted to assuring a certain legal status to aircraft passing from one country to another. They may in substance be extended to formulate a code, and enunciate penalties for its contravention, but apart from provisions of another character it is scarcely to be hoped that such agreements would exact a greater measure of respect from illicit profit-seekers than a scarecrow could command from hungry sparrows in a wheatfield

Assuming, therefore, that complete international agreements for the legalisation of air transport, code, penalties, and all have been brought into existence, and the high contracting parties, having legislated in due form against the international smuggler, the problem next arises, how is he to be kept out? The date and manner of his advent need be in no doubt. From the hour when a satisfactory margin of profit on his reprehensible enterprise becomes moderately assured he will be with us, and his tribe will be many.

That any preventive system devised against such an invasion can be entirely or immediately efficacious is scarcely probable. It must be recognised that the chances in favour of the modern "free-trader" will be great. Our special brand of weather will be his ally. And he will find in this country friends not a few. With a clear and timely recognition of the position, however, the creation of an approximately satisfactory working system to cope with the new traffic and its abuse *from its beginning* should be neither impracticable nor supremely difficult. Delay or half-hearted measures may, on the other hand, render it something like both.

In all previous revolutions in transport there has been a period of preparation, of gradual evolution during which surrounding circumstances have accommodated themselves little by little to the new factor without sudden change. It is a unique feature of the position in regard to air transport as the result of the present war, and the forced pace at which development of aircraft has proceeded under the spur of stern necessity and with unlimited capital backing, that with the return of peace the lineal successor to the railway, the bicycle, and the car, will come upon us full-grown. This circumstance renders it possible to achieve a tolerably accurate forecast of the characteristics and functions of the new traffic, the divergent lines of its early progress, the working towards permanence of certain varying types.

No great prophetic gift is thus needed to assume that in arriving at a practical solution of the problem presented two main classes of commercial aircraft will have to be considered, the first comprehending regular lines of large passenger carriers plying between fixed points, and the second including privately owned aircraft, or aerial tramps, finding their analogy in similar categories of our Mercantile Marine.

In regard to the former no great tax is likely to be made on the organising genius of our rulers. Fiscal requirements would probably be adequately met by the establishment of a Customs sub-centre at every regular point of arrival or departure, and the rendering it obligatory upon all air-liners to exhibit a special signal of entry disclosing their identity on passing the frontier, the carrying of certain lights at night, and by the closure of all but certain definite stretches of coast to the passage of this class of craft.

The question of dealing with the remaining category, comprising miscellaneous aircraft in commercial usage other than air liners travelling by fixed routes and time tables, presents greater difficulty, and must involve much heavier outlay. Nor would there appear to be any way of avoiding the establishment of an organisation based upon a thorough system of aerial patrols operating from stations at regular intervals all round our coasts, whose affair it will be to ensure the compulsory descent of all incoming craft other than regular liners at airports established at convenient points where the examination of cargo may be carried out and permits granted to proceed inland to destinations declared. It may be found necessary in time to supplement such a system by a second and interior line of patrols for the interception of aircraft which may have succeeded in slipping through the outer barrier.

The employment of such types of aircraft as small airships, or, preferably, direct lift machines—should the latter have arrived at a sufficient state of development for their utilisation—in a capacity analogous to that of guard ships at seaports, will probably figure in linking up the work of the coastal patrols.

The writer, a few months since, urged in writing the case for the establishment of a comprehensive Government system of Air Halts based upon the industrial map throughout the country as a necessary preliminary to the establishment of commercial air transport on a serious footing. The existence of such an internal organisation would undoubtedly tend greatly to simplify the task in store for the purifiers of air traffic. Its natural complement would be found in the provision at intervals along our coast line of airports restricted to the use of water-borne aircraft as distinct from marine craft proper, with aerodromes for land machines attached, and under the direct control of the new coastal services. The creation of a sort of aerial Lloyd's Register of Aircraft, based upon which the arrival or departure of aircraft passing overseas may be wirelessed to the coastal organisation of countries within its orbit, and a proper check kept upon their activities, would follow in rational sequence.

Whether upon the lines thus roughly indicated or otherwise, the institution of some such system, complicated and costly as it may prove, may be regarded as inevitable, and no multiplication of international agreements will serve to bate one jot of its essential necessity. Nor does that necessity arise from fiscal considerations alone; for if it is absurd to suppose that the authorities would permit the whole Customs and Excise system of the country to be set at nought at the will of any commercial adventurer in search of untried paths to affluence, it is unthinkable that after the lessons of the present war foreign aircraft should be permitted to the freedom of our skies unchecked.

The writer claims no more for the suggestions put forward than that, superficially at all events, they would appear to meet

the more obvious and general necessities of the position, and if it be urged against them that the outlay entailed must run into figures not pleasing to contemplate, it may be laid down without reserve that whatever lines be followed, and whatever system devised, the cost can be no light one and must find its justification in such security as it may afford against loss of yet greater magnitude.

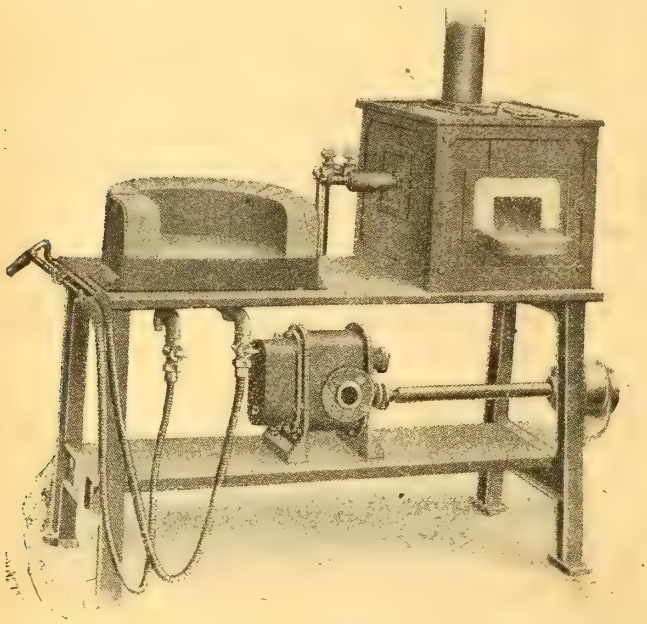
The only alternative from the purely fiscal point of view must seemingly be sought in such a remodelling of tariffs as would bring the main incidence of revenue duties upon commodities of too much weight or bulk for profitable transport by air; possibly also, in the devising of provisions touching the sale and make-up of light commodities, designed to render the placing of the smuggled article on its final market irksome and perilous to the transgressors. There is a certain cumbrousness about either suggestion.

The graver problem of protecting our national security from intruding foreign aircraft would, of course, remain.

FURNACES FOR AIRCRAFT WORK.

The attention of aircraft constructors is drawn to the different types of furnaces produced by the Davis Furnace Company, of the Diamond Foundry, Luton, Beds, who are in a position to supply all manner of heating appliances, especially crucible furnaces for metal melting, and more particularly oven furnaces for heating steel billets and plant for tool-making purposes.

The firm produces a distinctly neat tool-making outfit, containing a gas-heated oven, a D-shaped smith's hearth, a gas blow-pipe, and a blower which supplies air both to the oven and blow-pipe. This blower is of the rotary type, with extended shaft and fast and loose pulleys arranged for belt-drive.



The Davis Furnace, combining smith's hearth, furnace, blow-pipe and blower.

Those interested are recommended to get in touch with The Davis Stove Company, Ltd., at Luton, or at 15, Rathbone Place, London, W.1.

A CHANGE OF ADDRESS.

Hays, Hunter and Standen, Ltd., of London and Wolverhampton, whose name is well known in connection with "Don" Brake Lining and other specialities, are among the people who look ahead. Finding their business increasing in all directions, and in anticipation of further developments after the war, they are on March 31st moving their head offices and warehouse to 71, Southwark Street, S.E.1, which from that date onwards will be their London address.

THE MASS OF OFFICIALDOM.

An engineering correspondent of the "Morning Post," writing recently of the troubles of manufacturers owing to the mass of officials now employed, remarked:—

Later accretions to this unwholesome mass are the Recruitments Complaints Committees, the Munition Areas Recruiting Officers, the Munition Areas Dilution Officers, and some battalions of supervisors and directors, whose exact functions are not defined. Expressed in workshop vernacular, their duty appears to be to "mess about" generally.

Thousands of Labour Exchange, War Office, Admiralty, and Board of Trade officials are mixed up with this hotchpotch. No precise particulars are given to us, but my own calculation is that over 350,000 adult persons are occupied in the noble work of organising the engineering trades into impotency and confusion.

Let there be no illusion about this business. No industry can produce under this crushing and demoralising burden. Apart from the non-producing officialism of the workshops, much of which is clearly essential, every seven workers have to carry the weight of a salaried or feed State official.

If this official irruption is really inseparable from State Socialism and national control of industry it must force many of us to revise our ideals. If this mass of incapacity were merely useless it might still be barely tolerable, but it is an infinite mischief. It has shrivelled the energies and destroyed the enthusiasm of men and master alike.

Employers in the writer's circle of acquaintance say that it is no use trying. Every day brings some silly, peddling order from some official quarter, they are no longer masters in their own establishments, and if the superior young gentlemen of the Ministry know more about it than practised tradesmen let them go ahead.

The industry so essential to the national aim and inspiration needs a sharp stimulant, but its path of effort must be cleared of the obstacle of amateur direction and misgovernment. I have stated in these columns before that we are not producing adequately or securely. It is a hard thing to say, but the issues at stake are serious.

The industries cannot be organised by relays of State-paid meddlers or by clerical formalists with boxes of index cards. They will do their work and do it well if they are given the liberty that is the first need of efficiency. We must lose some scores of thousands of departmental officials or lose the war.

[And yet we are told that we want more air offices.—Ed.]

FORMS FOR FORMS' SAKE: OR, WHY THERE IS A PAPER FAMINE.

(Dedicated to the teeming thousands housed in various palatial hotels in London and elsewhere.)

Oh, we love a little work,
But we're gluttons for red tape;
So we issue tons of forms,
Of every size and shape.
Forms that make men wild,
None to keep 'em calm;
So another little form
Won't do 'em any harm.

Chorus:— Another little form,
Another little form,
Another little form,
Won't do 'em any harm.

Forms of gorgeous red,
Forms of navy blue,
Forms of snowy white,
Forms of bilious hue;
Forms which cause distraction;
None that soothe like balm;
So another little form
Won't do 'em any harm.

Forms to keep their cash,
Forms to make 'em pay,
Forms to push production,
Forms that cause delay.
Forms for work that's done,
Forms that spread alarm;
So another little form
Won't do 'em any harm.

Forms for forms returned,
Forms for forms retained;
Forms for forms unused,
Forms that fog the brain;
Forms entirely useless,
Forms that these embalm;
So another little form
Won't do 'em any harm.

Forms for payments made,
Forms for cash to come,
Forms for goods delayed,
Until we smash the Hun.
Forms for forms unissued,
Never cause a qualm;
So another little form
Won't do 'em any harm.

Forms for orders sent,
Forms for those to come;
Forms for bills received,
Forms ad nauseam;
Forms to sing a hymn,
Or even chant a psalm;
So another little form
Won't do 'em any harm.

Firth's
"Speedicut" High-Speed Steel
For turning Tools.

"Speedicut" Milling Cutters
and Drills
For all workshop purposes.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

Contractors to the
WAR OFFICE AND ADMIRALTY.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6810 (2 lines).

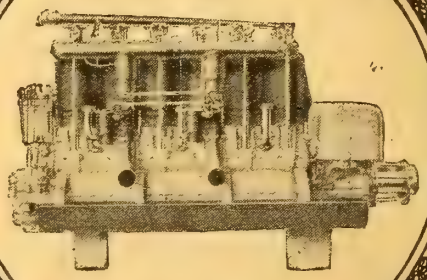
Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

BEARDMORE AERO ENGINE



The Name which guarantees EFFICIENCY and advanced design.

The BEARDMORE AERO ENGINE Ltd.
London Showrooms and Depots:
112, Gt. Portland Street, London, W.1.
Telephone: Gerrard 238.

C.D.C.

AIRCRAFT FINANCE

THE WHITEHEAD AIRCRAFT PROSPECTUS.

The inquiries received concerning this issue show that the comments made in these columns have aroused a certain feeling of caution on the part of many investors interested in Aircraft finance. One correspondent in particular asks the following very pertinent question: "What is the justification for demanding a premium on the shares issued?"

An examination of the prospectus shows that the Company is under obligation to meet the following annual standing charges:

	Per annum.
1. The First Mortgage Debenture of £150,000 at 6½ per cent. interest requires	£9,750
2. Redemption of these Debentures is contemplated over 15 years at a premium of 2½ per cent. requires (by effluxion the amount payable each year for interest would naturally be reduced)	£10,250
3. There has been issued, or agreed to be issued as fully paid up, as part of the purchase consideration, £100,000 Second Mortgage Debenture. No rate of interest mentioned, but we may assume it is not less than 7½ per cent. This requires	£7,500
4. The 300,000 7 per cent Preference Shares require	£21,000
Being tax free up to 5s. in the £ will require an additional	£7,000
5. The 650,000 10 per cent. Ordinary Shares will require	£65,000
The annual amount required to cover the fixed charges is therefore	£120,500
6. Mr. Whitehead is entitled to receive as remuneration £3,000 per annum. Each of the Six Directors is entitled to £500 per annum	
The Debenture trust deed gives the Trustees power to nominate two additional Directors (no mention of the names or number or remuneration of these Trustees is made in the prospectus), but in view of the fact that special powers are taken to pay to each Director all their travelling and other expenses, and their travelling and other expenses incurred in attending Board meetings, I think I shall be well within the mark if I set down the item of Directors' fees, Trustees' remuneration and Directors' expenses at	£10,000
7. Provision must then be made for the legal representative, Secretarial staff, and Auditors' fees, administration, and office expenses, printing advertising, etc., say, modestly	£10,000
8. Depreciation on the purchase consideration of £510,000, say, one half (the properties) at 5 per cent.	£12,750
And the other half (machinery and plant) at 10 per cent.	£25,500

The Company would therefore require £178,750 per annum to meet its standing charges, pay its Directors' fees and administration expenses, general expenses, and provide for depreciation.

To meet this amount the prospectus states that "the Auditors certify the profits to June 30th, 1917, to be at the rate of £23,966 per annum *before charging Interest on Loans, Mortgages and Debentures, Income and Excess Profits Duty.*"

It would be interesting to know what the actual *divisible* profit really is, that is, after deducting these liabilities for the reason that Mr. Whitehead in the prospectus states: "The present turnover is at the rate of nearly six times the rate per annum of the turnover during the 15 months ended June 30th, 1917," inferring that the profit will be sixfold.

I contend that if the proper charges for Interest on Loans, Mortgages and Debentures had been deducted, and provision made for Income Tax and Excess Profits Duty, very little of this already comparatively insignificant profit would have been left for the auditors to certify.

It is clear that the Company will require at least to make an annual trading profit of close upon £200,000 to pay its way, if one takes into consideration Income Tax alone, without considering Excess Profits Duty. Consequently, I reply to my correspondent that there is no possible justification for demanding a premium on the issue, and I go further and declare that there is nothing in the whole prospectus that even justifies the capitalisation at par, or the enormous purchase consideration payable by the Company to Mr. Whitehead. Last week in these columns it was shown that the issue, if wholly subscribed, would secure from the public £508,750, and after the cash payments to Mr. Whitehead and the redemption of the mortgage held by the Government would only leave £54,240 in the coffers of the Company.

It has since been pointed out by another correspondent that even this comparatively small amount would appear to be inexact, and it is liable according to the prospectus to be still further reduced. For the reason (1) that in addition to the large amount payable by this Company to Mr. Whitehead as purchase consideration this Company is liable *to pay all the liabilities of the old Company* (2).

This Company is further liable to pay all the legal charges and stamp duties on the transfer of the properties (3).

The Company has to pay the Brokers' fees and brokerage at 3d. per share (4) and over and above the 2s. 6d. per share payable to Mr. Whitehead as commission the prospectus clearly states that "the preliminary expenses, exclusive of *underwriting* and brokerage, are estimated at £20,000."

Endeavours are being made to ascertain exactly what this means.

The amount of Working Capital remaining available to the Company is of great importance, as it is (1) the only reason for a public issue and should not be permitted in these times for the benefit of any company promoter; (2) to show what justification it represents for the payment of £111,000 to Mr. Whitehead; and (3) because the prospectus refers to the earning capacity of the new capital (?).

The more one examines the details of this company promotion the more one marvels at the want of perception on the part of the Treasury officials.

There is comfort, however, in the knowledge that the investing public may rely upon the Stock Exchange Committee. They are not likely to be misled into granting a "settlement."

The new Issues Committee of the Treasury have been guilty of some stupid blunders in the past, but of nothing so glaringly absurd as to have permitted this Whitehead Aircraft prospectus to be publicly issued with Treasury consent. When will the Committee deign to consult men who know?

COMPANIES' PROCEEDINGS.

NEW COMPANIES.

Adastral, Ltd.—Private Company. Registered March 19th. Capital, £5,000, in 4,500 shares of £1 each, and 10,000 shares of 1s. each. To acquire from F. J. La Roche the trade mark, 375,007 "Adastral," and to carry on the business of aeronautical and general engineers, manufacturers of and dealers in metal aircraft components and metal parts for ordnance, shipbuilding, railway, or other engines, motor-cars, and vehicles, etc. The subscribers (each with one ordinary share) are:—F. J. La Roche, 1, Stanley Gardens, Hampstead, N.W., aeronautical engineer; P. C. Edmunds, 20, Wardour Street, W., licensed victualler. The first directors are:—F. J. La Roche (French) and P. G. Edmunds (English). Qualification, £100. Remuneration £50 per annum each (£100 for the chairman). Registered office: 1, Stanley Gardens, Hampstead, N.W.

Worms Aircraft Construction Co., Ltd.—Private Company. Registered March 22nd. Capital, £20,000 in £1 shares (5,000 pref.). To take over from M. Worms the business of manufacturer and designer of aircraft and aircraft parts and accessories, carriage builder and shipbuilder, carried on by him as the "Worms Aircraft Construction Co.," to establish and maintain lines of aerial, road motor, sea, river and canal boat services, etc.

The subscribers (each with one share) are:—M. Worms, Rutland Works, Bournemouth, aircraft manufacturer; F. Wright, 8, Stanley Mansions, Upper Tooting, secretary First directors are:—M. Worms (managing director), F. Wright, L. G. Worms, R. E. Jones, and A. Barnes. Solicitor: G. W. Cook, 70, Finsbury Pavement, E.C.

British Cellulose and Chemical Manufacturing (Parent) Co., Ltd.—Private Company. Registered March 30th. Capital, £3,500,000 in £1 shares. To acquire, hold and dispose of stocks, shares, debentures, debenture stock and obligations of the British Cellulose and Chemical Manufacturing Co., Ltd., or any other company, and to carry on the business of manufacturers, producers, importers, exporters and brokers of and

wholesale and retail dealers in chemicals, drugs, paint, varnish, dyestuffs and pharmaceutical preparations, motor-car, motor-boat, submarine and aircraft manufacturers, engineers, explosive manufacturers, etc.; also the business of an electric light and power company, etc. The first directors are:—Lt.-Col. W. G. Morden, Commander Sir A. Trevor Dawson, R.N., Sir Lionel Phillips, Bt., Sir Mitchell Mitchell-Thomson, Bart., H. McGowan, Dr. Camille Dreyfus, Dr. Hy. Dreyfus, A. Clavel and A. B. B. de Tscharner. Qualification (except first directors, who require none), £1. Remunerations, £50 each per annum, and £50 extra for the chairman. Solicitors: Grundy, Hershaw, Samson and Co., 5, Austin Friars, E.C. No notice of situation of registered office was filed with original papers.

The National Metal and Chemical Bank, Ltd.—Private Company. Capital of £1,000,000 in £10 shares, to carry on in the United Kingdom and any part of the world banking in all its branches; also to prospect and work properties, mines, and rights, and to carry on business as metal dealers, brokers, and general merchants, agents, and brokers, consulting engineers, assayers, etc. Power is taken to establish, maintain, and work lines of aerial conveyances.

Flight Motor Co.—March 1st, by Jordan and Sons, Ltd., 116-117, Chancery Lane, W.C. £250 (£1). Private. (149,752.)

Springthorpe, Ltd.—Private Company. Registered Jan. 16th. Capital, £2,000 in £1 shares. To take over the business of an engineer carried on by W. H. Springthorpe, at 135, Devonshire Street, Winson Green, Birmingham; also to carry on the business of manufacturers of and dealers in tension screws and nuts for aircraft, screws, bolt-nuts, box tools, for capstan lathes, aircraft components, motor accessories, etc. The subscribers (each with one share) are:—J. Vann, 33, Wretham Road, Handsworth, Birmingham (manufacturer); A. Vann, 2, Villa Road, Handsworth, Birmingham (manufacturer); W. J. Davis, 18, Ashfield Road, Kings Heath, Birmingham (manufacturer); W. H. Springthorpe, 48, Benson Road, Soho, Birmingham (engineer). Table "A" mainly applies. Registered office: 35, Devonshire Street, Winson Green, Birmingham.

DECLARATIONS OF DIVIDEND.

Sunbeam Motor Car Company.—An interim dividend of 5 per cent., free of tax, on the ordinary shares, payable 15th prox.

The Birmingham Small Arms Company has declared the following interim dividends for half-year ended 31st January:—On the "A" Preference shares at the rate of 5 per cent., less tax; on the "B" Preference shares at the rate of 6 per cent., less tax; on the Ordinary shares at the rate of 5 per cent., free of tax—all payable 2nd April.

AN EXPLANATION.

One gladly publishes the following note of explanation received from the "Nieuport" and General Aircraft Company, Ltd.:—

Owing to a notice which has recently appeared in the Press with regard to the voluntary winding up of Nieuport (England), Ltd., a false impression has arisen that it is this company which is being wound up. I shall be greatly obliged if you will correct this impression in your next issue.

The business of Nieuport (England), Ltd., was taken over by this company some twelve months ago, and as it had no *raison d'être* to remain in existence it was consequently liquidated. J. W. Thomson, Secretary.

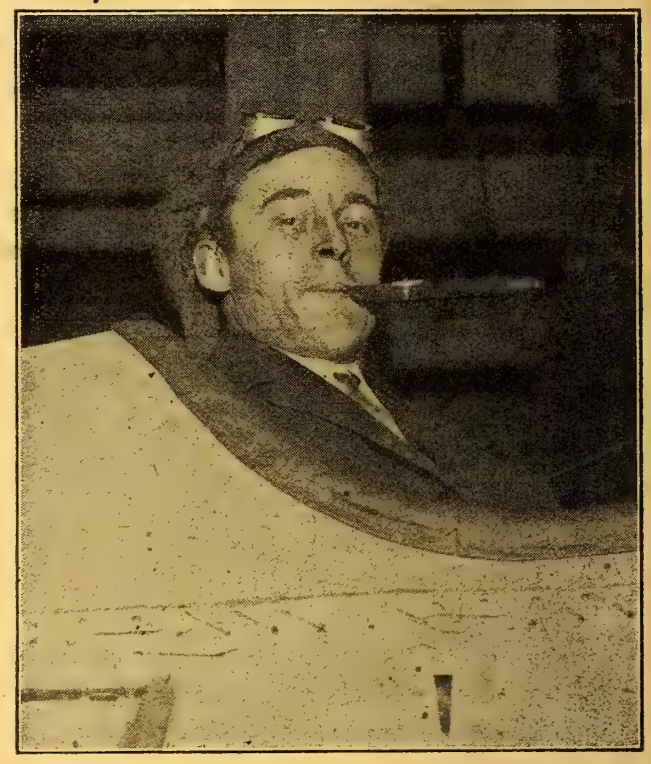
WHITEHEAD AIRCRAFT.

The attention of readers is particularly directed to the anaylsis of the Whitehead prospectus which is published under "Aircraft Finance" in this issue. Many people have asked for advice as to investing in this firm. One can only say that it is not an investment which one would recommend to one's friends. The "Financial Times" remarks that it is highly speculative. That is about the kindest thing one can say about it.

Various readers have asked why this paper accepts the Whitehead advertisements and then criticises the flotation adversely. The answer is very simply that anybody can buy advertisement space if they like to pay for it, and Whitehead money is as good as any other. The only excuse for refusing an advertisement, so long as the space is there to sell, is either that it is indecent or libellous. The Whitehead advertisement fails to achieve either distinction.

If the Advertising Manager of The Aeroplane refused to sell his space to the Whitehead Company and the firm's financial activities were then criticised in the editorial columns, one would then be open to the charge of slating the firm because it did not advertise—a charge similar to that made by Mr. "Owen John" in the "Autocar" against the present writer when he slated Coventry. At any rate, the acceptance of the Whitehead advertisements shows an absolutely open mind. Perhaps the Whitehead firm would now like to withdraw them.

Many readers have asked "What manner of man is this Whitehead who is so prominently before the world at the moment?" One feels that such curiosity is natural, therefore one takes the liberty of publishing a couple of typical photographs of Mr. Whitehead, in the hope that they may be at once entertaining and educative. It may be as well to state that the photographs were received from Mr. Whitehead himself, so one is justified in assuming that he is satisfied that they are sufficiently good likenesses.—C. G. G.



Mr. Whitehead's Pride in His Early Efforts.



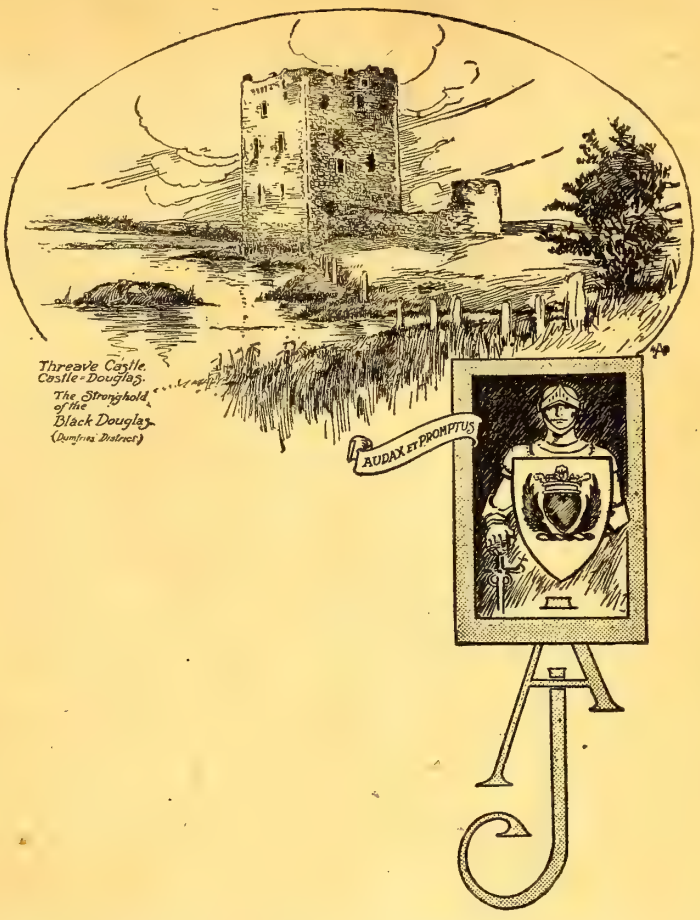
MR. WHITEHEAD'S BUSY DAY.— He is here seen having his breakfast, shaving, receiving a telephone message, making notes, dictating a letter, and accepting a telegram, all at once. One assumes that in spite of the picture Mr. Whitehead does not profess to be a Jack-of-All Trades.

THE whole Arrol-Johnston plant is being used in the manufacture of Aero Engines, but ——

THE ADVENT OF PEACE

will see the production of an Arrol-Johnston Car which will further enhance the great reputation the A.-J. Car already enjoys.

The waiting list is a big one, but there is still room for you.



Arrol-Johnston Ltd.
DUMFRIES.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE,

"CLERGET" PATENT AERO ENGINES.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

ENGINEERS, LONDON.

"GWYNNE, LONDON."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Where Flying Men are fitted out.



"..... All our Machines Returned Safely"

BALD official phrase, read by the man in the street with a joy none the less deep for his imperfect realisation of what it implies.

Not a single cold-benumbed hand failed at the controls, no eye or brain was so dulled with bodily misery that the faint grey smudges below lost their meaning as bearings

He, the Airman, alone knowing what these dark and perilous excursions mean—he it is who alone realises the vital urgency of securing the world's best flying kit. He is the man you meet at *Dunhills*.

It weighs with him that *Dunhills'* experience in air-kit making—and that goes both to the infancy of flight—is backed by an earlier (and a long and distinguished) experience in the kindred problem of kit-making for motorists.

LEATHER COMBINATION SUIT

Lined soft, snug camel fleece.

	To knee.	To ankle.
Tan Leather	**9 gns.**	**10 gns.**
Black „	**10** „	**11** „

Made with Map and other deep, useful pockets.

The Aviation Catalogue gives the res of the kit, so send a card for a copy.

Dunhill's

LIMITED.

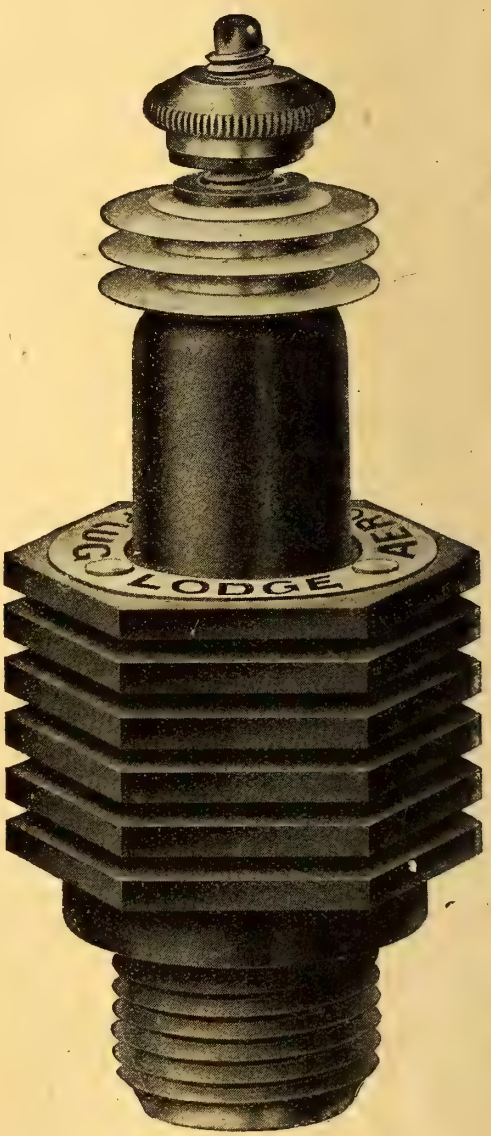
2, Conduit Street, London, W. 1.

MANCHESTER: 90 and 92, Cro s Street.

GLASGOW: 72, St. Vincent Street.

LODGE

AERO PLUGS.



Complete output reserved for British and Allied Governments.

MADE IN ENGLAND.

Illustrated Catalogue on Application.

THE LODGE SPARKING PLUG CO., LTD., RUGBY.

(*Continued from page 1242.*)

DEALY.—Lt. Thomas Sydney Ough Dealy, A.F.C., killed while flying on March 7th, was born in Hong Kong in 1896, and educated at Stonyhurst College, Lancashire. After leaving he went to Roseworthy Agricultural College, South Australia, where he obtained his first-class diploma in Agricultural Science and Veterinary Science, as well as the special medal for the latter. At Stonyhurst he became vice-captain of the school and of the football team. He also played for the college cricket eleven in two successive years. He was a good all-round athlete and an excellent exponent of boxing, golf, and tennis. When at Roseworthy he won the Old Students' Cup.

DEMPSTER.—Sec. Lt. Ian Mackay Dempster, R.F.C., who was killed on Feb. 24th after a fight in the air, was the youngest son of the late Mr. J. P. Dempster, J.P. for Western Australia, and Mrs. Dempster (née Patton, of Glenalmond), St. Ives, Cornwall. He was 20 years of age and was an observer in the R.F.C.

DOYLE.—Lt. M. W. Doyle, aged 25, was flying near Shenley, Hertfordshire, on March 23rd, when his machine fell 300ft. and he was killed. Mr. Doyle was 25 years of age.

EDWARDS.—Serjt. Stanley Edwards, R.F.C., was killed at Brooklands aerodrome on March 18th through the fall of his machine after looping the loop.

ERSKINE.—Capt. Ralph Erskine, R.F.C., who was reported missing on January 1st last, is now unofficially reported as having been killed in an air battle on that date. He was the younger son of Capt. James Erskine, Gordon Highlanders, and brother of Capt. T. Barrie Erskine, M.C., Gordon Highlanders, who was killed in France in 1915. He was educated at Allen Glen's, Glasgow. When war broke out he was a medical student at Glasgow University, and immediately joined up. He was given a commission in the Royal Scots Fusiliers, and saw some heavy fighting in France, being captain in that regiment at the battle of Loos. He afterwards joined the R.F.C., and served for a considerable time as an observer in France, where he was wounded, and mentioned in dispatches. After getting his "wings," he returned to France, and was sent from there to another front, where he was first British aviator to fall. He was a noted athlete, and represented Scotland in international long-distance races. He won the Public Schools Boxing Championship, and the amateur featherweight championship of the world. He married in March, 1917, Lennie, only daughter of Mr. and Mrs. W. Higgins, of Wimbledon, who, with an infant son, survives him.

FEAR.—Sec. Lt. Robert S. Fear, Worc. R., attd. R.F.C., who recently died of wounds, was son of the late William Henry Fear, of Walstanston. He was educated at Highfields School, and intended entering one of the universities, but when only 18 years of age he joined the Artists Rifles. He received his commission last September, and, subsequently transferring to the R.F.C., was wounded while flying on artillery reconnaissance.

FIELD.—Capt. Archibald William Field, R.F.C., who was reported "missing" on Jan. 9th, is now unofficially reported as having been killed in action on that date. He was third son of Mr. Edward Field, Clerk of the Peace for Warwickshire, and of Mrs. Field, of Blackdown Hill, Leamington. He was educated at Orwell House, Felixstowe, and at Rugby. At the outbreak of war he was in Vancouver Island, but immediately returned home, enlisted in the Shropshire Yeomanry, was granted a commission in the R.N.V.R. on Sept. 17th, 1914, and went abroad with the armoured cars on Oct. 2nd. He was in Antwerp during the siege, and saw much of the fighting throughout Flanders, including the first battle of Ypres and the battle of Loos, first with the armoured cars, and later, when he exchanged into the Army as a captain in the R.F.C. He was wounded in aerial combat on Sept. 25th, 1916, and, returning home, he took his pilot's certificate, and again went abroad on Sept. 27th, 1917.

GAMON.—Capt. S. P. Gamon, Cheshire Regt. and R.F.C., was the eldest son of Mr. and Mrs. J. P. Gamon, of Leighton Banastre, Parkgate, Cheshire, and was 23 years old. He was educated at St. Fillan's Heswall, The Leas, Hoylake, and Uppingham School. An application for entrance into the R.N.A.S. which he made in August, 1914, was refused, as he then held a commission in a Territorial Force as officer commanding the machine-gun section. This section was chiefly manned by men from the Chester Hydraulic Engineering Company, with whom he was completing a course of engineering, and he went to the front with his regiment in February, 1915, remaining with them there till May, 1916, and having during that time gained the permanent rank of captain. He then obtained leave to join the R.F.C., and was acting an observer in France from May to November, 1916, when he returned to England to take his pilot's course. Obtaining his wings early in 1917, he had since been engaged in the aerial defence of London.

A verdict of "Accidental Death" was returned at the inquest on March 25th, when it was stated that his machine fell into the grounds of a private house about half a mile from an Essex aerodrome where he was stationed. Capt. Gamon was 23 years of age.

GOPSILL.—Capt. Kenneth Lloyd Gopsill, East Surrey Regt., attd. R.F.C., second son of Mr. and Mrs. T. F. L. Gopsill, of Cheam, Surrey, was born at Handsworth, Staffordshire, in 1897, and educated at King Edward's School, Aston, Birmingham, and Alleyn's School, Dulwich. He was apprenticed to Tangyes, Soho, and was studying for matriculation at the Birmingham University when the war broke out. He enlisted in the 14th Royal Warwick Regt. on Sept. 17th, 1914, a few days before his 17th birthday, and served six months. In March, 1915, he was gazetted to the East Surrey Regt., and in Jan., 1916, was attached to the R.F.C. He served seven months in France with a fighting squadron, and returned home on Dec. 15th, 1916, being employed on the staff of the Central Flying School, Upavon. He was gazetted lieutenant on Sept. 5th, 1916, and temp. captain and flight commander on Mar. 1st, 1917, and returned to the front as flight commander in May, 1917. He was wounded on July 12th, 1917, and was appointed assistant instructor in England last November. He went to the front again on Feb. 12th last, and was killed in a flying accident on Feb. 15th.

GOSS.—Mr. Leonard Sidney Goss, R.F.C., who was reported on Sept. 19th, 1917, is now officially reported killed on that date. He was the only son of the late Sidney F. Goss and Mrs. Goss, of 81, Deodar Road, Putney, and the grandson of the late Capt. Henry Hunt Avon. Mr. Goss, who had seen active service in France for over three years, was acting as an observer in the R.F.C. at the time of his death.

GREGORY.—Capt. John Sheridan Gregory, R.F.C., formerly A.S.C., reported killed on the Western front, was educated under Mr. George Egerton, of Somerset Street, and at Westminster School. Thence he entered Trinity College, Cambridge, and took up Law. He graduated in 1911, having passed Law Tripos, Parts I. and II., and obtained his degrees of B.A., and LL.B. He then entered the Middle Temple. In Aug., 1914, he had passed all the Bar examinations except the final. He enlisted in the O.T.C. (Army Service Branch) two years before the war, and by Aug., 1914, he had qualified for and received Certificate A. In 1914 he at once joined the A.S.C. as second lieutenant. In 1917 he was attached to the R.F.C. as an observer, and was preparing to train as a pilot. A fortnight before his death he received the 1914 Star for his past services in France. Capt. Gregory was the younger son of Lieut.-Col. G. M. Gregory, V.D., and of Mrs. Gregory, of Gunterstone Road, West Kensington, and was 28 years of age.

GUEST-SCOTT.—Capt. Maurice Douglas Guest-Scott, M.C., R.F.C., who died on March 17th in Sussex as the result of a flying accident, was the only surviving child of the late Philip Guest-Scott, District Engineer, E.I.R., India, and of Mrs. Guest-Scott. He was 22 years of age.

HUDSON.—Capt. F. R. Hudson, R.F.C., son of the Rev. A. R. Hudson, rector of Huntsham, Devon, who was killed while flying at night on March 21st, was educated at St. Edward's School, Oxford. He joined the R.F.C. in October, 1915, and served in France from October, 1916, to May, 1917, when he was wounded, and had since been flying in England, obtaining his flight at the beginning of this year. He was 27 years of age.

HUGHES.—Lt. Thomas McKenny Hughes, K.R.R.C., attd. R.F.C., killed during February while flying abroad, was a prominent London Rowing Club oarsman. The son of the late Professor Hughes, F.R.S., he was educated at Eton and Trinity College, Cambridge. Early in the war he secured his commission in the K.R.R.C., but transferred to the R.F.C. early in 1917, and was engaged on special duties at the front when he met his death. He joined the London Rowing Club after leaving Cambridge, and was one of its most successful oarsmen during the three seasons immediately preceding the war. In 1912 he stroked the London eight for the Grand and the four for the Wyfold at Henley Regatta, the four winning two heats before losing the final to Queens', Cambridge, after a very hard race. The same crew afterwards won at the Metropolitan, Kingston, and Molesey Regattas. In 1913 he rowed "3" in the London eight for the Grand, and stroked the Wyfold four. At the last Henley before the war he rowed bow in the Grand and Wyfold crews. London won the latter event, defeating Magdalen, Oxford, Nottingham (Union), and Lady Margaret, Cambridge. In the season before the war Mr. Hughes took up sculling with success, winning the juniors at Molesey Regatta, and taking the junior-senior sculls at Kingston Regatta a week later.

IKIN.—Sec. Lt. A. E. Ikin, R.F.C., was killed while flying in France on May 11th. He was the eldest son of Dr. A. E. Ikin, Director of Education at Blackpool, was 19 years of age, and was educated at Hereford Grammar School, and later at Norwich, and gave considerable promise in science and mathematics. He gained honours in the Cambridge Locals when he was only 14.

and passed the London Intermediate Science Examination at 17. During his last year at school he won a Board of Education Exhibition of £50 a year at Cambridge, and also an open scholarship at Clare College. For two months before going to France Mr. Ikin had been engaged in night flying against enemy air raiders; but more recently he had taken part in night bombing over the enemy lines and on other special flight work.

KANN.—Lt. E. H. Kann, R.F.C., who was previously reported missing on Oct. 21st, 1917, and is now reported killed, was 21 years of age and the eldest son of Mr. and Mrs. René Kann, of Lancaster Gate. He had his commission in the Loyal North Lancashire Regt. in Oct., 1914, and transferring to the R.F.C., was given his "wings" in July, 1916.

KYNOCH.—Capt. Alexander Bruce Kynoch, R.F.C., who was killed in England as the result of an aeroplane accident on March 8th, aged 25, had seen service in Egypt, the Dardanelles, where he was wounded, and Macedonia. He originally served with the Duke of Wellington's Regiment, but later transferred to the R.F.C., and in October came to England to learn to fly. Within six weeks he had graduated, and he showed promise of becoming a skilled and efficient pilot.

LEY.—Capt. Christopher Francis Aden Ley, Yeomanry, attd. R.F.C., whose death was reported recently, was the second son of the late Sir Francis Ley, Bt., and was 24 years of age. He was educated at Pelham House, Folkestone, Malvern College, where he served both as house and college prefect and as sergeant in the O.T.C., and at Pembroke College, Cambridge. He took a keen interest in all games and sports, and was an excellent shot, being a member of the Malvern College VIII., and shooting at Bisley in 1911 and 1912. He also formed one of the team of four which won the Veterans' Trophy for Malvern at Bisley in 1913. He was appointed to a seat on the Board of Conservators for the Yorkshire Esk on the death of his father in 1916. Captain Ley received his commission in the Yeomanry in Sept., 1914, reaching the rank of captain in June, 1916, served in Gallipoli from August to November, 1915, and there contracted typhoid fever, and in consequence spent several months in hospital. He then joined the Royal Flying Corps, and was given his wings in May, 1917, and was wounded in an aerial fight in France last June. He had just been passed as fit for service, and was on the point of returning to the front.

A verdict of accidental death was returned at the inquest at Croydon on March 18th. Evidence showed that he crashed into a house near Croydon Town Hall, and was killed. Deceased was not one of the aviators scattering leaflets around the Tank, but was engaged on ordinary flying practice.

A police-inspector stated that deceased nearly collided with the Town Hall tower, which is only 170 ft. high, and then he ascended to over 1,000 ft. He nose-dived again, and failed to clear the houses.

An officer stated that deceased apparently misjudged the available air room for recovering from the dive.

LEWIS.—Lt. F. A. Lewis, R.F.C., was killed near Montrose on March 29th by his machine "nose-diving" to earth. He was a native of California, and was 23 years of age.

LUMLEY.—Henry Ralph Lumley, late Sec. Lt. R.F.C., who died on March 11th at the Queen's Hospital, Sidcup, Kent, was the youngest son of the late Ralph Robert Lumley and of Florence Lumley. He was 25 years of age.

MANLEY—MONTGOMERY.—An inquest was held on March 8th, on the bodies of Lt. Manley, R.F.C., and Lt. Montgomery, American Aviation Section. During a flight in formation which Mr. Manley was leading his machine fell in flames, bringing down Lt. Montgomery's machine in its fall. A verdict of accidental death was returned.

[Here, again, is a case where a properly arranged parachute would have saved one, if not two, lives. How much longer is this simple means of saving life to be delayed in its development?—Ed.]

Terence Wood Manley, R.F.C., was the only surviving son of Herbert Manley, M.D., Barrister-at-Law, of West Bromwich, Staffordshire.

MEREDITH.—Sec. Lt. Owen Watkin Wynn Hardinge Meredith, R.F.C., who was killed in action on Nov. 20th, 1917, was only child of the late the Venerable Thomas Meredith, vicar of Wolston and Archdeacon of Singapore, and of Mrs. Meredith, of Park Road, Leamington. He received his "wings" in July, 1917.

MESSERVY.—Capt. Ernest Dyce Messervy, London Regt., attd. R.F.C., who was reported missing on July 20th, 1917, is now believed to have been killed on that date. He was youngest son of the late Ernest and Dyce Messervy, of Telawakelle, Ceylon, and the nephew of Mrs. Thorne, of Highfield Park, Heckfield. Capt. Messervy was 23 years of age, and had his captaincy in the London Regiment on June 1st, 1916; his appointment as flying officer was dated February 28th, 1916.

MIDDLETON.—Lt. G. N. Middleton, R.F.C., belonging to South Africa, was killed while flying near Montrose on Feb. 21st.

MOORE.—Sec. Lt. Charles Ronald Moore, R.F.C., who was killed on March 8th, was the eldest son of Mr. and Mrs. Charles E. Moore, late of Worcester. He was born on May 8th, 1899, and educated at Trinity College, Glenalmond. He was appointed to the R.F.C. as a cadet in April, 1917, was gazetted Sec. Lt. in the September following, and obtained his pilot's wings in January of this year. He volunteered for service overseas in February, 1918, and was appointed to a squadron of the R.F.C. in France, where he was killed two months before attaining his nineteenth year.

MORRIS.—Lt. John Herbert Morris, R.H.A., attd. R.F.C., who was killed in action on March 6th, was the younger son of Capt. and Mrs. Alfred Morris, late of Langton, Blandford. He was nineteen years of age, and had his commission in the Royal Artillery in October, 1915; he had promotion in July, 1917, and in the following month received his "wings" in the R.F.C.

MUSPRATT.—Sec. Lt. Keith Knox Muspratt, M.C., Dorset Regt., attd. R.F.C., who died from the result of a flying accident in East Anglia, was 20 years of age, and the youngest son of Mr. Charles D. Muspratt, M.D., of Bournemouth. He had his Army commission in August, 1916, and, transferring to the R.F.C., received his "wings" in the following November.

He was educated at Wychwood, Bournemouth, whence he went to Sherborne School in 1911, and remained there until 1916. He was a School Prefect, and played football for his house—the School House—and was an active member of the O.T.C. From his earliest days he was enthusiastic about flying, and, training at Hendon, chiefly in his holidays, he took his flying certificate before he left school. Receiving his commission, he joined the R.F.C., and in the following November he had his "wings." His ability was recognised by his being employed as an instructor before he was 19, and afterwards by his appointment to a testing squadron. He went to France last May, and in September was awarded the Military Cross.

NICHEL.—Cadet Clark Brockway Nichel, American Flying Service, attd. R.F.C., died on Feb. 19th from injuries received in an aeroplane mishap in the Eastern Counties. He was 24 years old and had not been long in this country.

NORRIS.—Capt. Edward Fraser Norris, R.F.C., who was killed whilst flying at Oxford on March 15th, was the only son of the late Lt.-Col. E. E. Norris, R.F.A., and Mrs. Norris, of Harrow Weald. He was 22 years of age.

NUTKINS.—Lt. Vernon William Nutkins, R. Scots Fusiliers, attd. R.F.C., who was accidentally killed abroad on Feb. 19th, was the grandson of Mr. Alfred Saunders, of 37 and 38, Mark Lane, and Erin Villa, Putney, S.W. He was educated at University School, Hastings, which he left at the age of 17, in 1913. He entered Sandhurst in the following year, and was gazetted to the 3rd Batt. 7th R. Scots Fus., and was senior subaltern in his battalion. Later on he was posted to another battalion of the same regiment, and was made Lewis machine-gun officer, having previously been musketry officer to the 3rd Batt. He went to the front in 1916, and was twice wounded, and badly shaken by a shell which burst close to him.

ORCUTT.—Sec. Lt. M. H. Orcutt, R.F.C., who was killed in action on March 1st, was the second son of Mr. and Mrs. H. F. L. Orcutt, Rowington Hall, near Warwick. He was 20 years of age.

PASKE.—Flt. Serjt. Paske, a cousin of Lord French, was killed in a flying accident at Hounslow on March 22nd.

A verdict of accidental death was returned at the inquest at Hounslow on March 25th, and evidence showed that when some 600 ft. from the ground he rolled his machine and then tried a spiral nose-dive, from which he could not recover.

Capt. Benbow, R.F.C., stated it was unwise to roll a machine at such a low altitude.

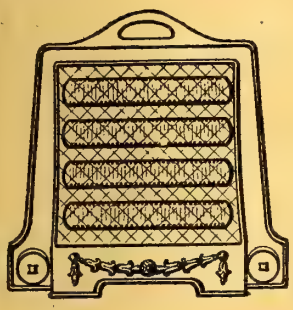
Flt.-Serjt. Reginald Cannon Paske, R.F.C., was second son of the late Gen. William Paske and brother of Maj. Arthur Goldingham Paske, Royal Fusiliers. He was 20 years of age, and was educated at Wellington College, where he won distinction in athletics, particularly in swimming. Enlisting in the Royal Flying Corps, he made great progress, and his Commanding Officer pronounced him an expert pilot. He was to have been recommended for a commission before leaving for France early next month.

PAYNE.—Sec. Lt. Henry Payne, R.F.C., of Surbiton, was killed through the fall of his aeroplane. The accident occurred in East Kent. At the inquest on March 14th, it was stated that medical assistance was sent to Mr. Payne by aeroplane.

PHILPOTT.—Capt. John Reginald Philpott, M.C., R.F.C., who died on Jan. 15th while a prisoner of war in Turkish hands, was the only son of Canon J. H Philpott and of Mrs. Philpott.

BELLING
ELECTRICAL ACCESSORIES.

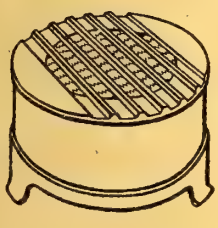
AIRCRAFT Manufacturing Purposes.



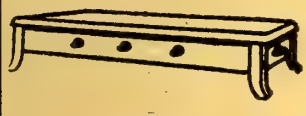
ELECTRIC FIRE.
OFFICE PATTERN. List No. 617.
An ideal fire for small offices, waiting rooms, passages, etc. We have also supplied a large number to Aerodromes for general heating. Numerous other designs are available.
PRICE **35 -**
Dimensions—Height 17⅜ in., Width 17¼ in., Depth 5¾ in.



ELECTRIC AIR WARMER.
List No. 960.
A reliable low temperature heating appliance, suitable for work rooms, etc. Can be used in any position without risk of fire.
PRICE **25 -**
Dimensions—Length 15½ in., Width 6½ in., height 4½ in.



ELECTRIC BOILING RING. List No. 7.
This will do all the same operations as an ordinary gas ring. Used for heating glue pots, and when loaded at 250 watts can be attached to any electric lampholder.
PRICE **15/-**
Diameter 7 in.



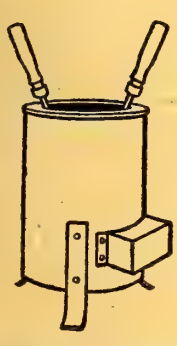
ELECTRIC HOT PLATE. List No. 18
Useful for keeping food warm, and also for drying purposes of all kinds.
PRICE **100/-**
Size 36 in. by 18 in.



ELECTRIC IMMERSION HEATER.
A reliable appliance for heating water, oil and other liquids. Can be easily fitted to existing tanks, etc.



ELECTRIC ENGINE WARMER.
For placing under engine in cold weather to prevent freezing. They are quite gas and fireproof.
PRICE **40/-**
Size 12 in. by 7 in.



ELECTRIC SOLDER POT. Type A.
This is the latest system for heating ordinary soldering irons, and consists of a pot of molten solder into which the irons are placed for a short time till heated.
PRICE **65 -**
Dimensions—Outside diam. 8in., inner pan 5⅜ in. diam. at top, Depth 7 in.

All the above prices are subject to an advance of 5 per cent.

Our Catalogue illustrates many other special appliances we make for Manufacturing Purposes, Munition and Factory Work, Hospitals, Mess Rooms, etc.

BELLING & CO., *MANUFACTURING ELEC. ENGRS.,*
DERBY RD. WORKS, MONTAGUE RD, EDMONTON, LONDON, N.18.

Controlled

That word has assumed a new meaning in our War experience and, to the firm with an organization capable of producing Munitions or other Government requirements, usually implies the complete cessation of normal business.

That is our position to-day, and every machine, every tool, every worker is engaged on the fulfilment of the National purpose, *but*—

That position will pass and, in the interests of British Manufacture, we desire, even at this period, to discuss the question of the mass production of Repetition parts, for which our greatly widened facilities are particularly suitable.

With this object we invite correspondence with bulk buyers, who desire, with us, to make real preparation for Post-War Trade.

SUCKLING
Wm. SUCKLING & SONS

KINGSWAY HOUSE, ALBION ST., BIRMINGHAM.
LONDON: MORLEY HOUSE, HOLBORN VIADUCT :: E.C.1.

1233

of Southchurch Rectory, Southend. He was 24 years of age, and had won the Military Cross. His appointment as Flight Commander was dated Oct. 7th, 1916. Mr. Philpott was educated at Windlesham House, Brighton, whence he obtained a foundation scholarship at Marlborough. After two years at Magdalen College, Oxford, he obtained a commission in Aug., 1914, in the Suffolk Regt. He transferred to the R.F.C. in Aug., 1915, obtained his "wings" in November, and went to France the following month. After nearly a year's service there, during which he obtained the M.C., he received his promotion as flight commander, and after a further period of home service he was sent with his squadron to another front in June, 1917. There he was taken prisoner on Sept. 25th when flying on reconnaissance, being brought down owing to the failure of his engine.

PITMAN.—Capt. Arthur F. E. Pitman, Seaforth Highlanders, attd. R.F.C., was reported missing on Jan. 3rd, and information has now been received from the British Red Cross, through their Copenhagen agency, that Capt. Pitman was killed in action on that date. Capt. Pitman, who was the eldest son of Mr. John S. Pitman, of 22, Douglas Crescent, Edinburgh, was educated at Evelyns and at Eton, where he was in the Eton Eight, a member of "Pop," and on the Athletics Committee. On the outbreak of the war he left Eton, a year before his time, and obtained a commission on Sept. 4th, 1914, as second lieutenant in the 5th Seaforth Highlanders. He went to France with his battalion on May 1st, 1915. After serving for 18 months in France, during which time he was A.D.C. to the Divisional General, and afterwards captain and adjutant of his battalion, he was seconded for service with the Machine Gun Corps, and acted as instructor to a "Tanks" Cadet Corps for some months in this country. In June, 1917, he was appointed to the R.F.C., and, after training, he went out to the front as a pilot on Nov. 1st, 1917.

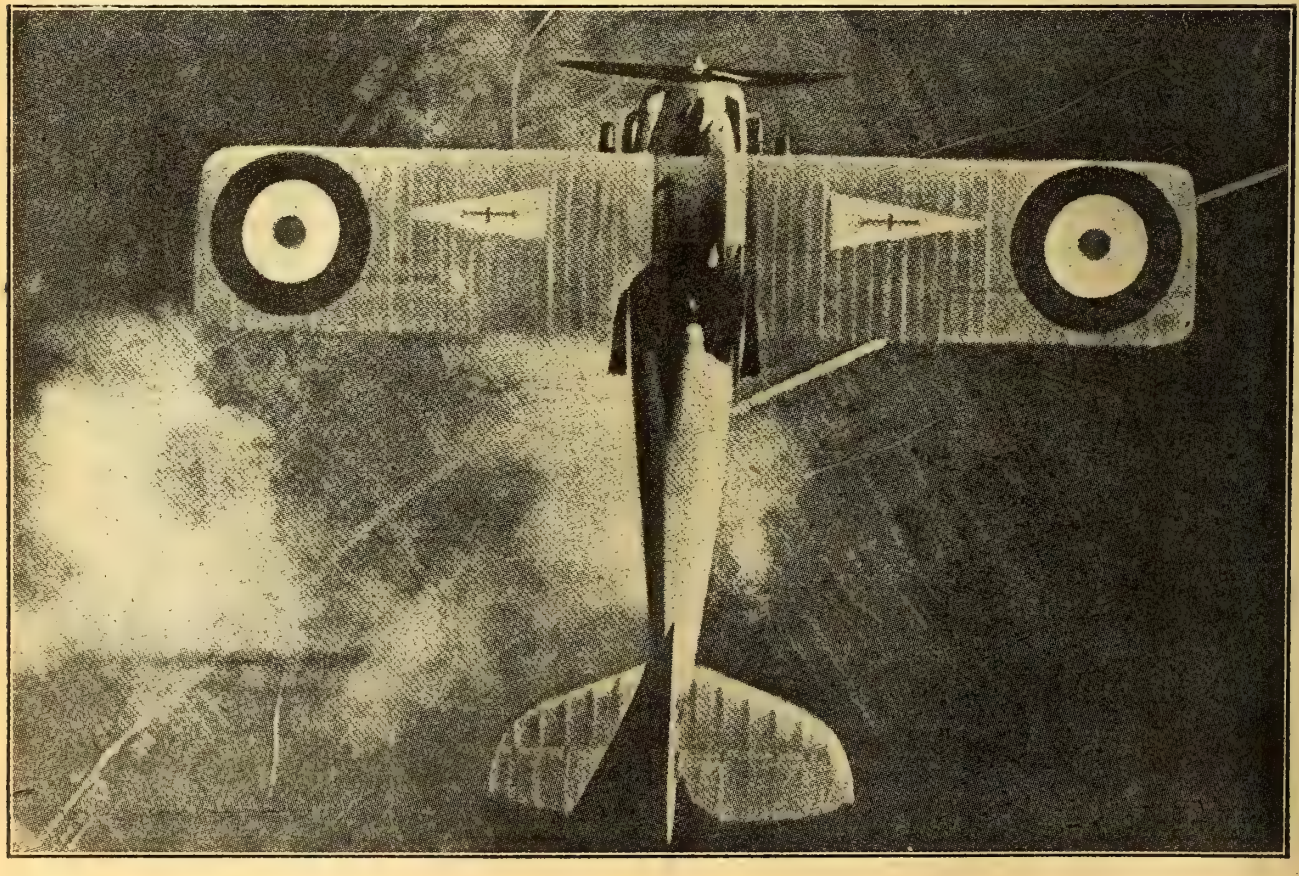
RICKARDS.—Lt. Hew Wardrop Brooke Rickards, R.F.A., attd. R.F.C., was reported missing on July 28th, 1917, and is now officially presumed to have been killed that day in action. He was the only son of the Rev. and Mrs. W. Brooke Rickards, of The Rectory, Sanderstead, Surrey. He was born in 1896, and educated at Arden House School, and at Uppingham. He left school in 1914, and went to France to learn the language, and when war was declared he enlisted in the French Army, being attached to the Foreign Legion, with which he saw nearly six months' active service. In February, 1915, he was transferred to the Home Army, receiving a commission, which was afterwards made permanent, in the R.F.A. He went out to France in July. In August, 1916, he was attached to the R.F.C., and in November was wounded when in action. On recovery he went through his training in England, and obtained his "wings" in May, 1917, when he returned to the front. On July 28th he was engaged on a bombing expedition behind the enemy lines, when he was reported missing, and he is now presumed to have been killed in aerial fighting that day.

RUTTER.—Lt. (temp. Capt.) Donald Campbell Rutter, M.C., R. Sussex R., Spec. Reserve, and R.F.C., who was reported missing on June 7th, 1917, at Messines, is now officially reported killed in aerial combat on that date, was the eldest son of Hugh Campbell Rutter, J.P., and Hilda Rutter, of Hazelwood, Morden, Surrey. He was 20 years of age.

SANDY.—Lt. J. Lionel Sandy, A.F.C., who died of injuries received in action, on Dec. 18th, 1917, was the eldest son of Mr. and Mrs. J. Montague Sandy, "Blenheim," Burwood, N.S.W. He was 32 years of age.

SCHNEIDERS.—1st Air Mech. Albert Michael Schneiders, R.F.C., who was killed in action on March 27th, was the youngest son of Mrs. Selina Schneiders, 26, Redlands Road, Reading (formerly 69, St. Gabriel's Road, Cricklewood), and brother of George H. Schneiders, Durward Street, E.1. He was 19 years of age.

SCOTT.—Lt. Charles Dalkeith Scott, Quebec Regt., attd. R.F.C., who was reported missing on Sept. 30th, 1917, is now, from information obtained from German sources by the British Red Cross Society and by the courtesy of Mr. Cohen, of Montreuse, reported killed in aerial combat on that date. He was the only son of the late Capt. Dalkeith Martin Scott (Superintendent Carmarthenshire Constabulary) and of Mrs. Scott, of 47, Rivers Street, Bath, and grandson of the late Lt.-Col. Edward Scott, of The Priory, Maidstone. He was educated at Bath College, where he was in the 1st Rugby XV, and also for several years served in the cadet corps. On leaving college he took up work in Vancouver Island, and was there on the outbreak of war, when he at once enlisted at Victoria, and crossed to England with the First Canadian Contingent in Oct., 1914. Early in 1915 he went over to France, and served with the 16th Canadian Battalion at the second Battle of Ypres, at Richebourg l'Avoué, and the various battles in which the 1st Canadians took part during that year. In January, 1916, he was given a commission in the Canadian Infantry, and was later appointed wiring officer to his brigade, serving at the front



Reproduced by courtesy of "Aerial Age Weekly."

AN UNCOMMON POINT OF VIEW. A SPAD single-seater fighter photographed while in flight from another aeroplane immediately above it.

PIONEERS
in aircraft design and construction

Blackburn
AIRCRAFT

The
BLACKBURN AEROPLANE
AND MOTOR CO., Ltd.,
Olympia, LEEDS.

Contractors to the
Admiralty and War Office.

"Always at the Front!"

Steele's Ad. Serv.

ALUMINIUM CASTINGS
OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.
Cambridge Street Works, BIRMINGHAM.

until October, 1916, when he was wounded and sent home. On recovery he was attached to the R.F.C., and, taking his pilot's certificate early in September, 1917, was sent out to the front, where, when on special duty behind the German lines, he was attacked by a "large formation of enemy scouts" and seemed to be overwhelmed and driven down "after a fine fight." Mr. Scott was 28 years of age.

SCUDAMORE.—Capt. Robert Capel Scudamore, M.C., Gen. List and R.F.C., who was killed in action in France on Feb. 26th, was the only son of Mr. and Mrs. Capel Scudamore. He was 23 years of age.

SELOUS.—Capt. F. H. B. Selous, M.C., Royal West Surrey Regt., attd. R.F.C., who was reported missing on Jan. 4th, 1918, is now officially reported killed on that day, aged 19. He was the eldest son of the late Capt. F. C. Selous, D.S.O., the well-known African hunter and explorer, who was killed in action in East Africa on Jan. 4th, 1917. He was educated at Bilton Grange, Rugby, and at Rugby, where he showed signs of becoming a fine athlete, and was in the Running VIII, and captain of the Rugby XV in 1915. He entered Sandhurst in Sept., 1915, and on leaving in April, 1916, was gazetted to the Royal West Surrey Regt. and attached to the R.F.C. He went to the front first in July, 1916. He was awarded the Military Cross and the Italian Silver Medal for Military Valour.

SONDHEIM.—Sec. Lieut. Walter Sondheim, R.F.C., who was accidentally killed on March 4th while flying, was 20 years of age and the only son of Mr. and Mrs. S. Sondheim, of Park Town West, Johannesburg. He was appointed to the Royal Flying Corps in October, 1917.

STROUD.—Capt. H. Clifford Stroud, R.E., attd. R.F.C., who was killed on the night of March 7th-8th, aged 24, was the only son of Professor H. Stroud, of Armstrong College, Newcastle-on-Tyne.

After taking his B.Sc. in engineering at Armstrong College, Newcastle-on-Tyne (Durham University), he proceeded to King's college, Cambridge, and graduated B.A. He was a student of the Institute of Civil Engineers and a graduate of the North-East Coast Institution of Engineers, before which body he had read papers, and received institution prizes. He was gaining his practical experience at Sir William Arrol's, Glasgow, during the university vacations, and intended to complete his practical training after taking his degree.

After spending two years in the O.T.C. at Durham University, he joined the Northumbrian Divisional R.E. Territorials in 1912, and on the outbreak of war immediately volunteered for foreign service. He went to France with the first Field Company N.R.E., and was severely wounded in the legs on February 18th, 1915. He spent many months in hospital, and on his recovery went to Otley, and was engaged in the teaching of bombing and trench warfare. As his wounds unfitted him for active field work he joined the R.F.C. in July, 1916, and after he had obtained his theoretical training he qualified for his wings, and was gazetted on Sept. 22nd, 1916. During the subsequent months he became an expert pilot. He was very popular with his colleagues, and will be deeply missed by his many friends.

SYKES.—Sec. Lt. Leslie Gordon Sykes, R.F.A., attd. R.F.C., who died on March 22nd as the result of a flying accident was the only son of Mrs. H. H. Sykes and the late Lt.-Col. H. H. Sykes, V.D., of Briarcourt, Lindley, Huddersfield.

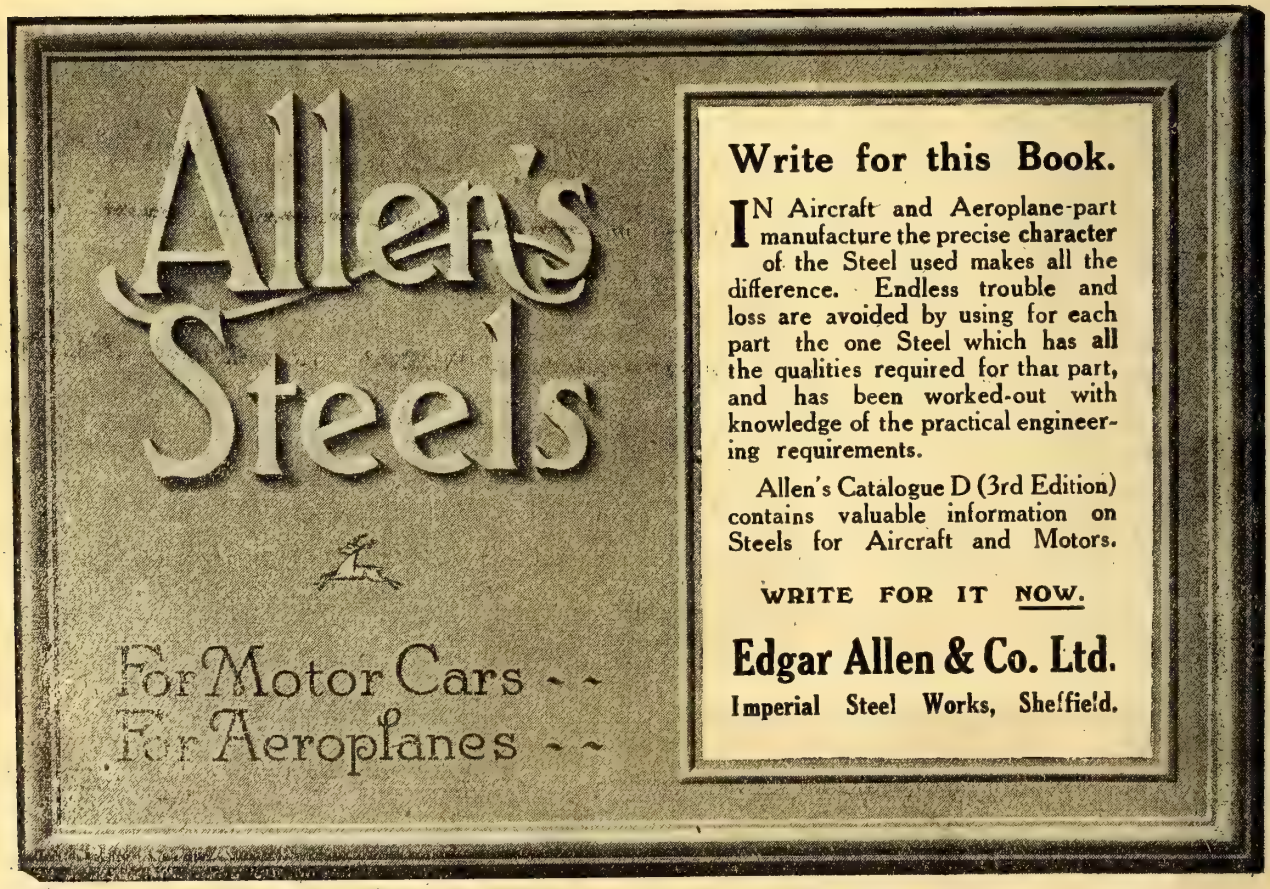
TANCOCK.—Lt. Osborne George Tancock, M.C., R.F.A., attd. R.F.C., who was killed on March 17th while flying abroad, was 20 years of age and the elder son of Lt.-Col. and Mrs. O. K. Tancock, of Bedford. He had his promotion to the rank of lieutenant in July, 1917, and had won the Military Cross.

TAYLOR.—Capt. G. C. St. C. Taylor, London Regt., attd. R.F.C., who was killed in action on March 17th, was the husband of Doris Taylor (née Reynolds), of 105, Cranbrook Road, Ilford, Essex. He was 28 years of age.

THOMPSON.—Lt. J. W. R. Thompson, R.F.C., killed in action on March 22nd, was the son of Mr. A. Warren Thompson, of St. Nicholas Street, Scarborough, who almost at the same time received news that a younger son, Sec. Lt. A. E. Thompson, R.F.C., was wounded on March 24th and is now in hospital. Mr. J. W. R. Thompson, who was 22, took a lively interest in local sports at Scarborough, in particular hockey and swimming. He joined the R.F.C. in the early days of the war, and received his commission in the field. He was twice mentioned in dispatches. For some time he had been in England on instructional duties, and at his own request he went out to the front again about two months ago.

THOROWGOOD.—Capt. and Flt.-Comdr. Leslie Vernon Thorowgood, R.F.C., who died on March 22nd as the result of an accident, was the only son of Mr. and Mrs. Arthur F. Thorowgood. He was 23 years of age.

TILNEY.—Maj. Leonard Arthur Tilney, M.C., who was killed on March 9th whilst fighting in the air over the enemy lines, held the rank of Lieutenant Royal Horse Guards and that



ALL-BRITISH

M-L

MAGNETOS

THE main features of "M-L" ALL-BRITISH MAGNETOS are great reduction in size and weight as compared with pre-war magnetos of the same electrical output, effective sparking at very low speeds and strict interchangeability—permitting prompt supply of spares.

The M-L Magneto Synd., Limited
Victoria Works, Coventry

If your Service after the War

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.

PROMPT DELIVERY AGAINST "A" CERTIFICATE.



FIRST IN 1880 FOREMOST EVER SINCE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.
Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,
NEW CROSS, LONDON, S.E.

ROK ROOFING

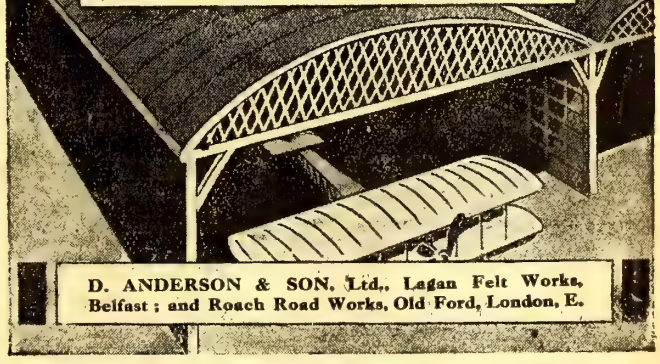
facilitates the speedy erection of Hangars by combination with our famous "Belfast" Girder Principals in

ANY CLEAR SPAN UP TO 100 FEET.

BRITISH & BEST

Write for Booklet "R."

48



D. ANDERSON & SON, Ltd., Lagan Felt Works, Belfast; and Roach Road Works, Old Ford, London, E.

of Sqdn. Comdr., R.F.C. He was in his 23rd year, and was elder son of Lt.-Col. R. H. Tilney, D.S.O., at present on service abroad, and of Mrs. Tilney, of Millbank House, Tattenhall, Cheshire. Maj. Tilney was educated at St. Neots, Eversley, Hants, and at Eton.

On the outbreak of the war he was in camp with the E.C.O.T.C., and immediately obtained a commission in the Duke of Lancaster's Own Yeomanry, of which his father is colonel. Three months later he joined the R.F.C., and obtained his "wings" in virtually record time. Proceeding to the Western Front, he was promoted Flt. Comdr. in Sept., 1915, and afterwards returned to the Central Flying School as instructor.

In July, 1916, he transferred to the Royal Horse Guards, being still seconded to the R.F.C. In Feb., 1917, he was given command of a squadron which he led with great distinction, gaining the Military Cross and the Belgian Croix de Guerre, and being made an Officer of the Order of the Crown of Belgium.

TINNE.—Capt. Stuart Christian Tinne, R. West Kents and R.F.C., whose death was announced recently, was born on Aug. 21st, 1895. He was educated at Mr. Churchill's, Broadstairs, and Wellington College, and entered Sandhurst in Feb., 1913. Receiving his commission in the West Kents in Aug., 1914, he went to the front the following month, but was wounded and incapacitated at the end of that year. After long hospital treatment, and being disabled for infantry work, he joined the R.F.C. in March, 1916, and went to the front with the — Squadron in Oct. of that year. In April of last year he was attached to the Photography Section, and was engaged in that work up to his death.

TIPTON.—Capt. Richard J. Tipton, R.F.A., attd. R.F.C., who died of wounds on March 11th, was the third son of John W. and Mary Tipton, Oxton, Birkenhead. He was 25 years of age.

One who shared captivity with him says:—

"Capt. Tipton was one of the three officers who escaped last autumn from Kastamuni to the north coast of Anatolia and thence across the Black Sea to Russia—a seven weeks' journey. He went to France in February, and had only been there a few weeks when he received the wound of which he quickly died, at the age of 25. To perish within so short a time of escaping from a prisoners' camp seems like the acme of ill-fortune, but 'Tiny,' as he was called by way of allusion to his 6ft. 4in., had no other wish than to get back to the front, and would not have desired a better fate than to be killed in action. He refused an offer of promotion which would have involved his remaining in England. The officers and men who were his fellow-prisoners loved him, and will learn of his loss with the deepest regret."

TREGARTHEN.—Lt. Ernest W. Tregarthen, Royal Welsh Fusiliers, attd. R.F.C., was accidentally killed while flying on March 18th. He was the son of the late Mrs. Tregarthen, of Westville Road, Cardiff, was 30 years of age, and was formerly with Messrs. Hull, Blyth and Co., of the Docks, Cardiff. While with them he became an associate of the Secretaries' Institute, and he was working for his final examination when he joined the Inns of Court in November, 1915.

VINSON.—Capt. Albert Higgs Vinson, R.F.C., who was killed on March 22nd, was the elder son of Albert Vinson, J.P., Parsonage Farm, Belvedere, Kent. He was 21 years of age.

WATSON.—Sec. Lt. George W. A. Watson, R.F.C., who was killed on March 7th, was the eldest and only surviving son of the late James Watson, of Conistone, near Grassington, and was 20 years of age. He was educated at Appleby Grammar School, and when war broke out he was an engineering student at Leeds University, where his work showed signs of great promise; and he immediately offered himself for service in the R.N.A.S. As he was only 17 at the time he was refused as too young, and he then enlisted in the R.N.D. After serving for some months he was brought back to Leeds to take a position as assistant manager of a department in a shell factory; but this work did not satisfy him, and he soon applied again for a commission in the R.F.C., and was successful. At the end of his training he came out head of 300 in the examination. He went to the front only a fortnight before his death.

WESTLAKE.—Lt. Albert Neave Westlake, M.C., B.A., North Staffordshire Regt., and R.F.C., who was previously reported missing and is now reported killed on Jan. 4th, was the only son of Mrs. Westlake, Wayside, Waleham, Dorset. He was 24 years of age.

WHEELOCK.—Sec. Lt. Charles Herbert Wheelock, R.F.C., who was killed on March 19th as the result of an aeroplane accident, was the son of Mr. and Mrs. C. R. Wheelock, Orangeville, Ontario, Canada.

WORSLEY.—Sec. Lt. Reginald Eric Milne Worsley, R.F.C., who was killed in action on March 8th, was the eldest son of Edward Milne Worsley, formerly of Dedham, Essex, and grandson of Reginald Worsley, solicitor, of Manchester. He was 20 years of age.

YOUNG.—Lt. James Hill Young, London Regt. and R.F.C., who died on Jan. 17th of wounds received on Jan. 12th while

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

ENGINEERING EMPLOYERS' FEDERATION 1896

Telegrams
JONAS,
SHEFFIELD.

REGISTERED
I C N O V O
TRADE MARKS

Telephone:
No. 4660.
PRIVATE BRANCH EXCHANGE.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. — **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. — **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. — **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

TO ENSURE ECONOMY AND EFFICIENCY

SPECIFY

VICTOR FLEXIBLE BACK BLADES

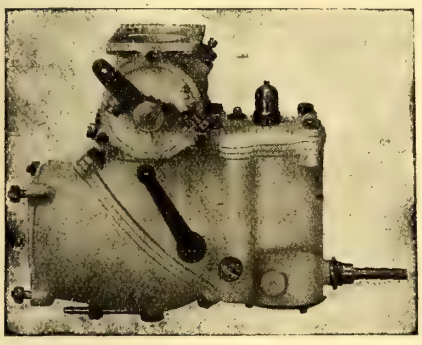


EVERY BLADE COUNTS.

VICTOR SAW WORKS

(CANADA) LIMITED,

283, WEST STREET, FINSBURY CIRCUS, E.C. 2.

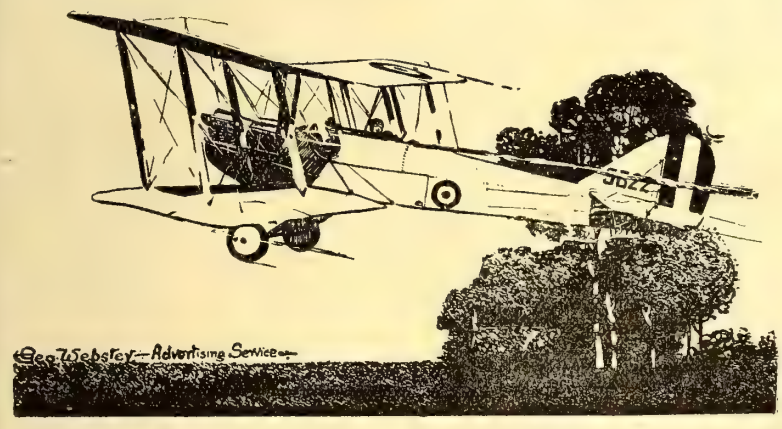


Claudel-Hobson

CARBURETTORS

Supplied to the Air Board
— for Aeroplane Engines —

H. M. HOBSON, LIMITED
29 Vauxhall Bdg. Rd., London, S.W. 1



METAL COMPONENTS
FOR
AIRCRAFT.

Undercarriages
Tail Units
Tubular Framework.

THOMPSON BROS. (Bilston) Ltd.
AERO. DEPT., Bilston, Staffs.

THE MIDLAND MOTOR CYLINDER Co. LTD.

SMETHWICK Nr. BIRMINGHAM

TELEPHONE—289 SMETHWICK TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

a prisoner of war in Germany, was the son of James Young, Columcille, Bromley, Kent. He was 30 years of age.

ENGAGEMENT

McKENNA—LALLEMAND.—An engagement is announced between Capt. Hugh W. McKenna, R.F.C., and Hélène, youngest daughter of Mme. Lallemand, of Civray and Paris. The marriage will take place in Paris, the date to be announced later.

MARRIAGES.

DENNING—SMYTHE.—On March 21st, at St. Mary Abbot's, Kensington, Capt. C. ffolliott Denning, M.C., R.F.C., eldest son of Dr. and Mrs. C. E. Denning, of Epping, was married to Eileen J. Smythe, youngest daughter of Mr. and Mrs. Smythe, Darlington, Yorks, by the Rev. J. Keith.

EVANS—TURNER.—On March 23rd, at St. Paul's Church, Herne Hill, Sec. Lt. John Morgan Evans, R.F.C., second son of Mr. and Mrs. Evans, of 88, Balfour Road, Ilford, was married to Isabel, eldest daughter of Mr. and Mrs. G. W. Turner, of 186, Loughborough Road, Brixton, by the Rev. L. P. Smith, M.A.

McKINNON WOOD—SPICER.—On March 27th, at Whitefields, Sec. Lt. Ronald McKinnon Wood, R.F.C., third son of the Rt. Hon. Thomas McKinnon Wood and Mrs. McKinnon Wood, of 16, Portland Place, was married to Gwendoline Elaine Dykes, fifth daughter of the Rt. Hon. Sir Albert Spicer and Lady Spicer, of 10, Lancaster Gate, by the Rev. A. Sandison, uncle of the bridegroom.

BIRTHS.

BEOR.—On March 29th, at the Imperial Nursing Home, Cheltenham, the wife of Lt.-Col. B. R. W. Beor, R.F.A. and R.F.C.—a daughter.

WISE.—On March 9th, at Beavor Lodge, Hatch End, Middlesex, to the wife of Lt.-Col. P. K. Wise, D.S.O., R. War. R. and R.F.C.—a daughter.

FRANCE.

OFFICIAL COMMUNIQUÉS.

March 27th.—Allied aviators successfully bombed the enemy depôts of Demirhissar (east of the Struma) and the encampments to the south-east of Resna (north of Lake Prespa).

March 28th.—Army of the Orient.—British aviators carried out successful bombardments in the region of Doiran and on the railway line Seres-Drama.

March 29th.—In the period from March 23rd to March 26th our aviation Service took part in the battle in conditions that were particularly costly to the enemy.

Our infantry aeroplanes, our bombing and chasing crews, as well as our photographers and observers, distinguished themselves by their courage and endurance, and did very hard work both by day and night.

On the 23rd alone one of our groups of squadrons carried out 125 patrols and 120 reconnoitring missions. Many squadron reports, moreover, have not yet been received in the region St. Quentin, Ham, La Fère, Noyon.

Over 50 tons of projectiles were dropped between March 22nd and March 26th on convoys and moving trains and on gatherings of enemy troops, which suffered losses from these air attacks that were carried out with admirable boldness.

Descending sometimes to a height of 60 feet from the ground our pilots attacked enemy contingents with their machine-guns and fired thousands of cartridges.

Among other operations must be mentioned that which we carried out in the afternoon of March 27th, when 60 fighting and 20 bombing machines swooped down upon masses of German infantry and put them to flight after mauling them severely.

In addition, there were explosions in several munition depots and great fires were observed in the course of these bombardments.

Our bombing machines belonging to the Eastern district cooperated in the general plan of action by attacking the great strategic railways stations of Metz-Sablons and Thionville. Several fires by very violent explosions broke out in the station of Metz-Sablons.

During the night of March 23rd-24th one of our squadrons dropped 3¼ tons of explosives on the Badische Aniline Factory at Ludwigshafen, the chief German factory for the production of poison gas.

Finally, 37 German aeroplanes and six captive balloons were brought down and destroyed by our pilots and five other machines by the anti-aircraft defences.

March 30th.—During the days of March 27th and 28th our aviators, notwithstanding the bad weather, renewed their attacks against the enemy.

Our machines, flying in groups, sprayed with machine-gun fire, and dropped bombs on, the enemy troops in the line of battle and in their concentration zones. Several of our machines made as many as three sorties in the one day; 17,000 kilogrammes (17 tons) of bombs were dropped in the Noyon-Guiscard-Ham region.

Our chaser squadrons, in the course of numerous contests, brought down 13 German machines, seven of which were totally destroyed and six seriously damaged. Two captive balloons were also set on fire.

April 1st.—On March 29th and March 30th, in spite of the rain and low-lying clouds, our aviators made many flights.

Five thousand kilos (about five tons) of bombs were dropped on enemy cantonments and railway stations in the neighbourhood of St. Quentin, Guiscard, and Roye. Our aviators frequently attacked with machine-guns and bombs assemblies of enemy troops and dispersed them.

Nine enemy machines and a captive balloon have been destroyed by our aviators.

Italian bombarding machines have taken an active part in recent expeditions and have carried out with magnificent audacity numerous raids over the enemy lines.

Army of the Orient.—French and Serbian aviators successfully bombed enemy cantonments in the region of Pardovica (Vardar Valley) and Rozden (Tcherna region).

HEATING AND VENTILATION

DOPE SHOPS, AERODROMES, AND AIRCRAFT FACTORIES.

WHEELER & SONS, Phone—PARK 652.
1a, VICTORIA GARDENS, LONDON, W.11.

THE POOLE AVIATION CO.
POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

HIDE GLUES *FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.*

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

ELECTRIC CABLES



E. KALKER & CO.,
COVENTRY.

Aeroplane General Sundries, Ltd.

Manufacturers of
AEROPLANE & AERO
ENGINE FITTINGS

A.G.S. **Bolts a Speciality**

All kinds of small turning and repetition work undertaken at short notice.

A.I.D. INSPECTION AT WORKS.

Telephone—
Holborn 4959.

Telegrams—
Zeppishout,
Holborn,
London.

Registered Office—
FULWOOD HOUSE,
FULWOOD PLACE,
HIGH HOLBORN,
LONDON, W.C.

What do you do with your Waste Wood?

Turn it into Power & Profit?



If not, write for particulars of our Wood Refuse Suction Gas Plant, which will generate gas from sawdust, chippings, wood blocks, etc., and not only turn waste into profit but make you independent of coal supply.
We have helped other Aeroplane factories in this way. May we help you?

For fuller particulars write, on business note paper, mentioning AEROPLANE, to Sole Makers:

RUSTON, PROCTOR & Co. LTD LINCOLN

AEROPLANE

RUBERY, OWEN & Co
TELEPHONE No 87 DARLASTON
TELEGRAMS ROOFS DARLASTON
TRADE MARK
DARLASTON SOUTH STAFFS

ACCESSORIES

7 Years' Experience.

The special correspondent of the Havas Agency with the French armies at the front writes:—

The day before yesterday (March 25th) two entire German divisions advancing towards the battle front were completely annihilated, before they were able to fire a single shot, by machine-gun fire and bombs from about 100 French aeroplanes.

* * *

A Reuter's message from Paris, dated March 27th, states:—

The French Aviation Service took part with considerable effectives in the battle. The results obtained are quite remarkable, and our mastery of the air is being emphasised daily in the theatre of operations.

Our machines drove off the enemy chasing aeroplanes and joined in the fighting in squadrons and groups of squadrons, fiercely attacking columns of infantry and artillery convoys, bivouacs, munition depôts, railway lines, and the enemy's main lines of communication.

They dropped as many as 15,000 kilogrammes (about 15 tons) of explosives in 24 hours and fired thousands of cartridges on the Germans, whom our airmen incessantly attacked with machine-guns, descending almost level with the ground.

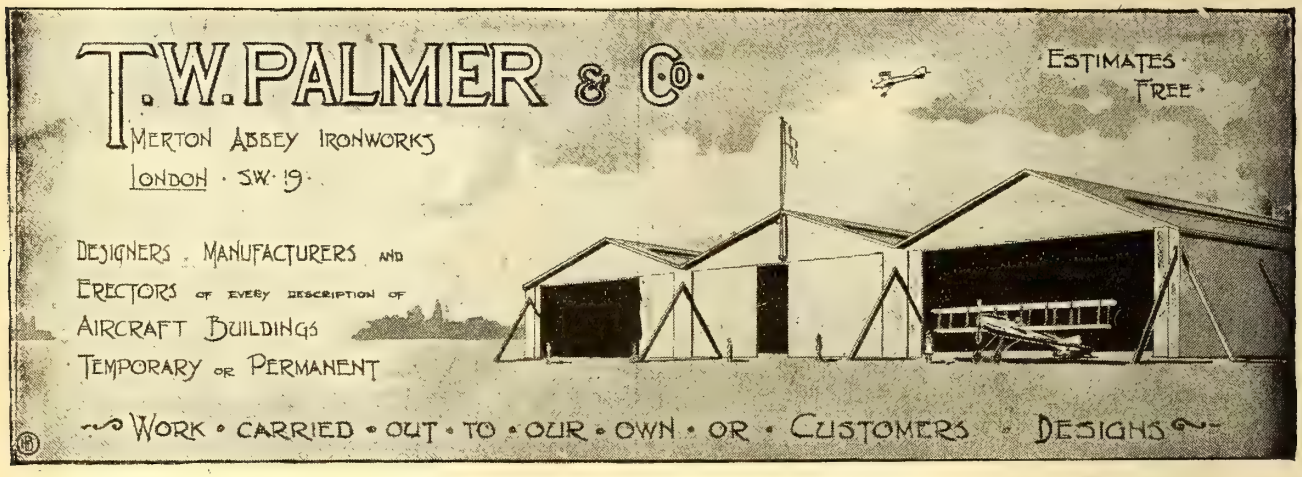
A fire was observed in very important ammunition parks, trains on the move were stopped, six observation balloons were set on fire, and a great number of enemy machines were brought down. Important railway junctions connecting the Western front with Central Germany were effectively hit by our bombing machines.

The enemy pilots appeared to be disconcerted by the rapidity and violence of our aerial counter-attack. On the other hand, great enthusiasm prevails among our airmen, who, in these difficult hours, are rivalling in bravery and audacity our magnificent soldiers.

* * *

A Reuter's message from Paris on March 12th states that the Municipal Council of Paris has decided to give assistance to families stricken in the recent air raids and to grant perpetual concessions for their burial. The Government has decided that a special detachment of the military shall attend the funeral of each victim and that the coffins shall be covered with a Tricolour pall.

[It is interesting to note that the French Government has decided to refuse to recognise the civilian victims of air raids as non-combatants, a course adopted by the British authorities some time ago.—Ed.]



THE
Eastbourne Aviation Co. LTD.
ESTABLISHED 1911



AEROPLANE CONSTRUCTORS
Contractors to the Admiralty



TELEGRAMS: Aircraft EASTBOURNE
PHONE: 1176

VENUS PENCILS

NO pencil has so wide a range as the 'Venus,' and all 17 grades are excellent. The hard grades give lines of as rich a black as the soft grades—they do not merely dent the paper—a common fault with inferior makes. This is all-important to the draughtsman. Venus Pencils are equal to the utmost you may require of them; the price is moderate—the service infinite.

17 Grades, 6B (Softest) to 9H (Hardest) Blacklead—also Copying

Of all Stationers, Stores, etc., throughout the World.

"VENUS," 173/5, LOWER CLAPTON ROAD, E.5.





SANKEY

FIREPROOF

Steel Storage Bins

Clothes Lockers. Tool Chests.

Write for details:

Joseph Sankey & Sons, Ltd.,
Hadley Castle Works,
WELLINGTON, Shropshire.



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd.
The Linen Hall, Regent Street, London, W.

THE USE OF

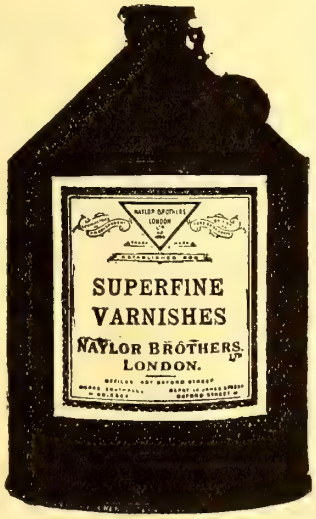
NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.

Some Specialities for Aero Work

Wood fillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.



Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.
Contractors to all Government Departments.

Offices: 407/9, OXFORD S .. LONDON, W.
Works: SOUTHALL MIDDX.

HIGH-CLASS

ALUMINIUM CASTINGS

FOR ALL TRADES.

We Specialise in Aluminium Cylinders and General Aero and Motor Engine Castings,

CAST IRON CYLINDERS

Water and Air-cooled for Aero & Motor Engines

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,

Atlas Works :: Grove Street,

BIRMINGHAM.

ALUMINIUM AND IRON FOUNDERS.

GERMANY.

OFFICIAL COMMUNIQUÉS.

MARCH 26th.—Since the beginning of the battle 93 enemy aeroplanes and six captive balloons have been brought down.

Rittmeister Baron von Richthofen achieved his 67th and 68th aerial victories, Lt. Bongartz his 32nd, First Lt. Lörzer his 24th, Corpl. Baumer his 23rd, Lt. Kroll his 22nd, and Lt. Thuy his 20th aerial victory.

MARCH 27th.—Rittmeister Baron von Richthofen achieved his 69th and 70th aerial victories.

MARCH 28th.—Rittmeister Baron von Richthofen achieved his 71st and 72nd aerial victories.

MARCH 29th.—Rittmeister Baron von Richthofen obtained his 74th aerial victory.

* * *

The "Cologne Volkszeitung" of March 25th says:—

"About 1 o'clock last night enemy airmen attempted to attack Cologne. Eight bombs were dropped. The airmen were warded off from the inner city by gunfire and the extinguishing of lights. The only object hit was a pile of timber on the outskirts of the city, which took fire. No one was hurt."

ITALY.

OFFICIAL COMMUNIQUÉS.

MARCH 26th.—Along the whole front the usual artillery actions and moderate activity of our reconnoitring parties are reported.

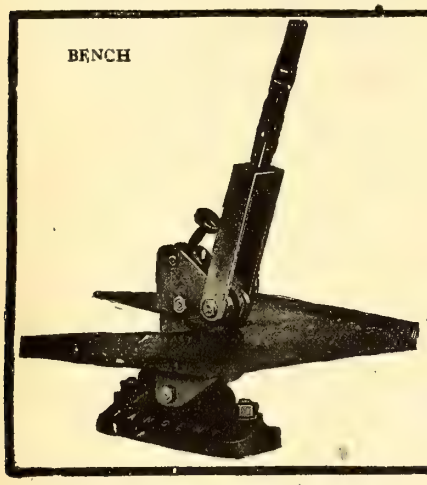
Five enemy machines were brought down at S. Pietro di Feletto (12½ miles east of the Piave) and Biadene (? Valdobbiadene, on the east bank of the Piave); a sixth hostile aeroplane was brought down by French aviators in the vicinity of Montebelluna (within the Italian lines south-west of the Montello).

MARCH 28th.—Two enemy aeroplanes brought down by British aviators fell to the east of S. Donà di Piave.

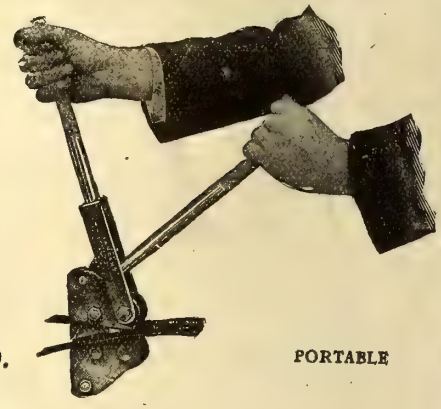
MARCH 29th.—Last night our flights dropped 6½ tons of bombs on the railway works of Mattarello and Primolano (Brenta Valley) with very good effects; various big fires were observed. Two enemy aeroplanes were hit by our anti-aircraft fire; one of them was brought down and the other compelled to land beyond the enemy lines in the neighbourhood of Ponte di Piave.

MARCH 30th.—At dawn this morning our aeroplanes bombarded railway lines and aviation grounds of the enemy. An enemy machine was brought down by our aviators in the vicinity of Ponte di Piave, and another by British aviators near Spresiano (right bank of the Piave, five miles below Montello).

BENCH

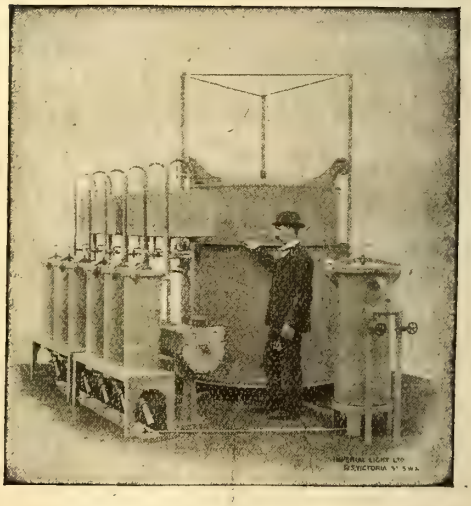


TANGENT
SHEET METAL SHEARING
APPLIANCES
PATENT
Self - Feeding. Fast - Cutting.
Blocks illustrate a combined portable and bench tool for sheets up to 3/32" ☐ steel, and ⅛" softer metals. ☐
Other types also made, including portable hand tools for Corrugated Iron.
WRITE FOR DESCRIPTIVE PAMPHLET
MONTGOMERY, SMITH & CO. LTD.
Patentees and Manufacturers,
TANGENT WORKS, KEYNSHAM, SOMERSET.



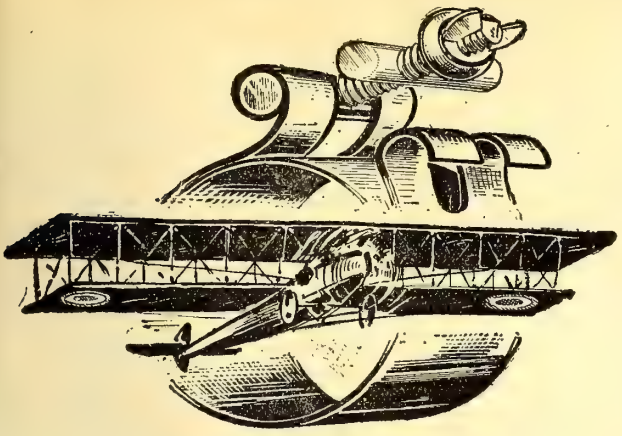
PORTABLE

TRADE MARK
Bowden Wire Ltd:
LONDON
Victoria Road, Willesden Junction, N.W.10.
THE varied uses and adaptations of Bowden Wire mechanism are recognised by almost every department of State Service. The war work which we have in hand for Home and Allied Governments precludes for the present our acceptance of private orders.
Established 1897.



Class 5 Imperial Acetylene Welding Plant.

OXY-ACETYLENE
PLANTS
IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.
Telegrams—"EDIBRAC, PHONE, LONDON."
Telephone—VICTORIA 3540 (3 Lines)



TERRY

for every kind of Hose Clip.

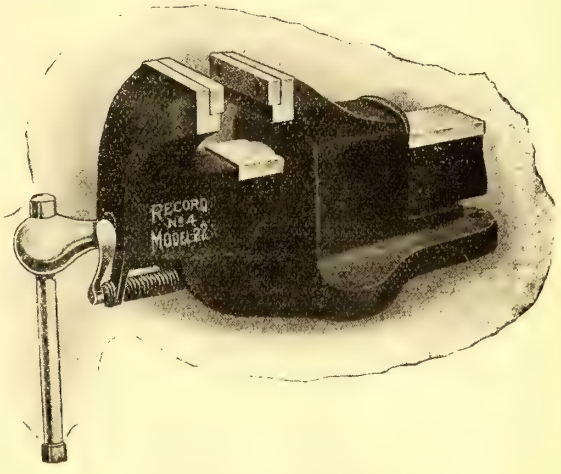
FROM $\frac{3}{16}$" dia. to 7" dia., we have made Hose Clips, and we can make any desired pattern; flat, grooved or cupped section metals, with any method of fixing. Write us now about your War needs.

HERBERT TERRY & SONS, Ltd.,
The Spring & Presswork Specialists,
Redditch, ... England.



(3)

BENCH VICES



PROMPT DELIVERIES.

C. & J. HAMPTON, Ltd.,
SHEFFIELD.

TELEGRAMS: "VICES, SHEFFIELD."

Of special interest to Government Contractors.

J.B.BROOKS & Co Ld

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments, and Cases of

LEATHER

J.B.Brooks & Co.Ltd.
104 Criterion Works
Birmingham.

1131

BUY

Your Streamline Wires

FROM

THE ORIGINAL MAKERS

BRUNTONS

MUSSELBURGH,
SCOTLAND.

We can supply Wires, plain, screwed or fitted with Fork or Universal Joints.

March 31st.—British aviators brought down six hostile machines above Manste (north-east of Oderzo) and one on the Melette (Asiago Plateau); two more were forced to land in this last area. One of our pilots shot down an enemy aeroplane on Campomolon, while another one was hit by our anti-aircraft batteries and fell in the Ornic Valley (north of Mt. Tomba).

* * *

According to an official at the Vatican, the Pope has declared to the members of the Sacred College that any aerial attack on Rome will be regarded as an offence against the Roman Catholic Church and an attack on the neutrality of the Holy See. In the meantime, the Pope is taking steps to guard the art treasures of the apostolic palaces.

[This seems to be a case where charity begins at home. Also it shows a lamentable mistrust in his own temporal and spiritual power.—Ed.]

BELGIUM.

Official Communiqué.

March 27th.—A hostile aeroplane has been brought down in our lines after a combat.

A Reuter telegram dated 12.7 p.m. April 2nd reports that Zeppelins were sighted at a great height at Amsterdam on April 1st. The Flushing correspondent of the "Handelsblad" reports that an aerial attack on the Belgian coast occurred on April 1st lasting about four hours.

LUXEMBURG.

A Berlin telegram says that at 12.45 p.m. on March 28th, enemy aviators attacked the town of Luxemburg. Ten dead are reported.

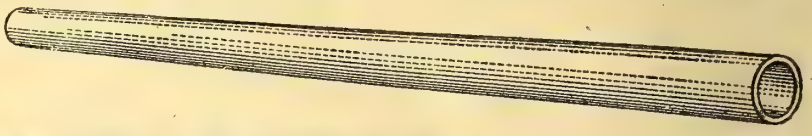
NORWAY.

Capt. T. Gran, R.F.C. (better known as Lt. Trygve Gran, of South Polar fame, and as the only aviator to fly from Scotland to Norway), who is recuperating from wounds received in action, gave a lantern lecture on March 25th in Christiania.

TURKEY.

Official Communiqué.

March 27th.—On the Euphrates an enemy aeroplane was brought down. The occupants, the Commander of the British Air Corps and a major of the General Staff, were captured. The machine will be ready for service after a few repairs.

Patent No. 4704/15.

McGRUER SPARS
are THE ACME of
STRENGTH and LIGHTNESS

Particulars from:—
McGRUER BENTWOOD HOLLOW SPAR Co.,
Commercial Wharf, Lambeth, LONDON, S.E.1.

Bowden

BOWDEN CONTROLS AND BOWDEN CABLES FOR ALL AEROPLANE PURPOSES.
Quotations on application.
Note Address—
The BOWDEN BRAKE Co., Ltd., Tyseley, B'HAM.

Tyseley

AIRCRAFT DEPARTMENT

THE WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS
British Metal (Kingston) Ltd.
The Factory,
Kingston-on-Thames.

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, De H.
RESIDENT A.I.D. EXAMINER.

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street Hanover Square, W.1.

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET, BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
47, VICTORIA ST., S.W.

Works:
HIGH ST., MERTON, and HENDON

THE AIRCRAFT CONSTRUCTION CO.

EVERY DESCRIPTION OF METAL COMPONENTS.

Immediate Delivery of SE SUMPS.

HARLEY AEROPLANE WORKS, Beckton Rd., E.16
Telegrams: "Aercracons," Canning, London. 'Phone: East 1300.

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE AIR SERVICES.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

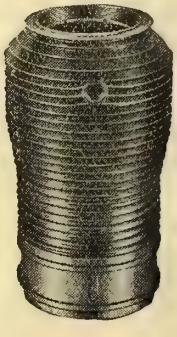
"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED.
Telegrams: Cellutate, London. **8, WATERLOO PLACE, S.W.1.** *'Phone: Regent 4045.*
Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)



THE
Beverley Engineering Works

Aeroplane Cylinders
Clerget Le Rhône Gnôme



WILLOW AVENUE, BARNES, LONDON. **'Phone: Putney 478**

THE SIBERIAN & GENERAL TRADING CO., LTD.
Can supply from stock or for prompt shipment
PLYWOOD
IN ALL WOODS, SIZES AND THICKNESSES.
SPECIALITY: BOARDS FOR AIRCRAFT WORK.
HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. **Telephone—London Wall 3577.**

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Contractors to H.M. Government.

SWIFT
AVIATION CO.

Dolphin Engine Plates in Stock, Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE—
762 KINGSTON

'GRAMS—
"SWIFT, KINGSTON"

TIMBER

SILVER SPRUCE
ENGLISH ASH
WALNUT & MAHOGANY

JOSEPH OWEN & SONS
Limited

Borough Saw Mills,
LONDON, S.E.1.

Telephone: Hop 3811. Telegrams: "Bucheron Sedist."

AIRCRAFT COMPONENTS

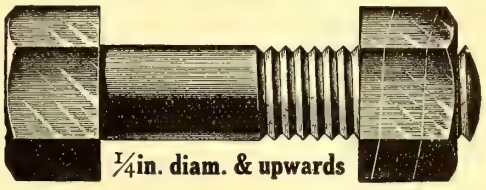
QUICK DELIVERY OF ALL DESCRIPTIONS OF AEROPLANE COMPONENTS.

METAL FITTINGS, ETC., ETC.

'PHONE: LONDON WALL 6725.

National Aircraft Mfg.Co.
15, HACKNEY ROAD, LONDON, E.2

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

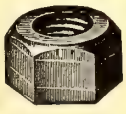
(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ¼in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.

London Offices: 139/141, CANNON ST., E.C.4.

Auster (1914) Ltd for **AUSTER-TRIPLEX SHIELDS**
AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

BIRMINGHAM:
Crown Works, Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

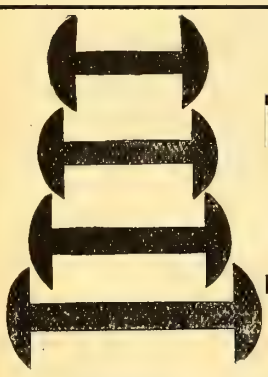
CRADOCK'S STRANDS & CABLES
Manufactured from Tinned Steel Wire of the Highest Quality.
CONTRACTORS TO HIS MAJESTY'S GOVERNMENT.
GEO. CRADOCK & CO., Ltd., Head Office and Works: WAKEFIELD. London Office: 7 East India Avenue.

'FEARLESS' ENGINE CLEANING BRUSHES
As used by the R.F.C.



Send Trade Card for FREE SAMPLE.
FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD. LONDON —— N.16.

Lang Propeller LTD.
Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.



DON'T HAVE TROUBLE
specify
SMITH & DAVIS MAKE
of
GREEN'S
Pattern
BELT FASTENERS.
From all Mill Furnishers and Ironmongers.
Wholesale only from Makers:
SMITH AND DAVIS, LIMITED.
STAMPERS & PIERCERS, Hampton Street, BIRMINGHAM.

HEATING, DRYING AND VENTILATION.
Kinnell's
OF DOPE SHOPS, AERODROMES AND AIRCRAFT FACTORIES, &c. OF EVERY DESCRIPTION. List 1134 free.
C. P. KINNELL & CO., LTD. Phone—Hop 372
65, SOUTHWARK ST., LONDON, S.E.1.

THAMES BANK (BLACKFRIARS) IRON Co., Ltd.
THE
Upper Ground St.
LONDON, S.E.
SPECIALISTS IN
HEATING AND VENTILATING
Factories, Hangars and Doping Shops.
TELEPHONE: HOP 763.
TELEGRAMS: "HOT-WATER FRIARS, LONDON."

Aeroplane Steel Sheets
as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers
Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")
BERNARD NICKLIN & CO.
IRON AND STEEL WAREHOUSE
SMETHWICK, BIRMINGHAM
Telegraphic Address: "Bernico," Birmingham.
Telephone No.: 224 Smethwick.

ANNOUNCEMENT

Our factory at Holloway is equipped with an up-to-date plant and we are prepared to undertake all classes of Wood and Metal Work. Customers' orders quickly carried out to any design.

JOHN INNES & CO.,
Aeronautical Engineers,
20, DENMAN ST., LONDON, W.1.
—— "Write us your needs." ——

"CROID"
LIQUID GLUE
Adopted by
H.M. Admiralty, etc.
Sole Manufacturers:
The Improved Liquid Glues Co., Ltd.,
Gt. Hermitage Street
London, E.
Contractors to H.M. Government.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'EATONIA' Process.)

Y.E.S. 'AERO' BRONZE
(Under A.I.D. Inspection.)

PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3' 6" long.

THE MOST DURABLE YET PRODUCED.

SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, LTD.,
WORTLEY, LEEDS.

STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK

J. B. GUTHRIE & SON
(JOHN J. GUTHRIE)
30, ST. MARY AXE, LONDON
TELEGRAMS—BUSIRIS LED, LONDON. E.C.3.
TELEPHONE—AVENUE 1432.

The Air Navigation Co., Ltd.

BLERIOT & SPAD AIRCRAFT WORKS,
ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground - Brooklands Aerodrome.
NORBERT CHEREAU, Managing Director.
Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

HOPTON & SONS
(HOPTONS)
GEORGE STREET, EUSTON SQUARE, LONDON, N.W. 1 & UNION WORKS, MARKET HARBORO', LEICESTERSHIRE.—

PIONEER TIMBER MERCHANTS AND BENT TIMBER MANUFACTURERS OF
AEROPLANE PARTS

Telephones—
Museum 496.
Mkt. Harboro' 13.

ESTABLISHED
1840.

Telegrams—
Hoptons, Eusquare, London.
Hoptons, Mkt. Harboro.

The Best Piston Rings

Scientifically designed. Made from high tensile cast iron and hammered to give an even radial distribution of pressure. Gaslight. Sizes up to 30 in. diam.

The **BRITISH CHUCK & PISTON RING CO. LTD.**
Holbrook Lane, **COVENTRY.**



TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST,"

ALLAN BEALE & CO.,
SPECIALISE IN THE MANUFACTURE OF AIRCRAFT COMPONENT PARTS.
34 BEECH ST., BARBICAN, LONDON, E.C.1
PHONE LONDON WALL 7509.

Willesden 33 **H. BURTON & CO., LTD.,** Slotting Phone-London.
CANNON WORKS, WILLESDEN, N.W.10.
A.G.S. FILLERS, FILTERS, COCKS, FLANGES, UNIONS, Etc.
PETROL COCKS, UNIONS, TEES, ELBOWS, FOUR-WAYS, H.P. TANK FITTINGS.
DELIVERY FROM STOCK. Ask for Particulars of our Stock.

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

NAME PLATES.
WE SPECIALISE IN EVERY DESCRIPTION OF NAME PLATES IN METAL, VORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

ALWIN ENGINEERING CO., AERONAUTICAL ENGINEERS.
A. E. CARTLIDGE. LUTHER ROAD, TEDDINGTON, S.W.
Tel. No. Kingston 2412.
TRADE MARK ALWINS
Makers of all kinds of Aircraft Fittings.
Presswork a Speciality,
Pressings for DeH, etc
Avro, Sopwith, Fairey and many other types
On receipt of Post Card our Representative will call and give immediate quotation.

Springs! Springs! Springs!
We make a speciality of
Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

SYSTEMS at RACING & ROULETTE
A book of absorbing interest to all System lovers, showing how a regular and substantial income can be earned with small capital.
Price—THREE PENNY STAMPS.
SIMPLEX PUBLISHING, 1, NEW OXFORD STREET, LONDON, W.C.

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

P.D.V. Aircraft Company, Ltd
All Metal Parts for Aircraft made, comprising the following machine work: **Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work.** Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices & Works: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

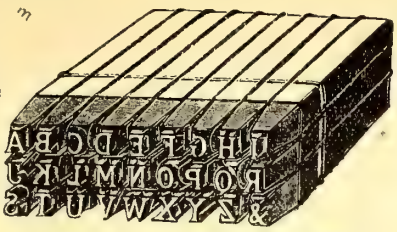
EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.



STEEL STAMPS



STENCIL PLATES

BRANDING IRONS

STEEL LETTERS & FIGURES

'PHONE: EAST 3331 (4 LINES). CONTRACTORS TO HIS MAJESTY'S GOVERNMENT. TELEGRAMS: DAYHUR, PHONE, LONDON.



JOHN MEERLOO & SONS

CLEVELAND WORKS, CLEVELAND STREET, MILE END, LONDON, E.1.

Registered Trade Mark.

NONFLAMOID

Non-Inflammable Transparent Celluloid.

LONDON LABEL CO., Ltd.,

Contractors to H.M. Government.

HARLEY WORKS, BECKTON RD., LONDON, E.

WIND SHIELDS
MAP COVERS
OBSERVATION PANELS

Prompt deliveries of every type.

LUMINOUS PRINTING

Labels for Instrument boards, &c., for night work.

Any special article made up to templates or drawings and delivered by return.

N.B.—Nonflamoid is very much lighter and easier to work than any kind of glass, also it will stand much harder usage.

MISCELLANEOUS ADVERTISEMENTS.

WANTED.

Woodwork for aeroplanes, very large factory, fully equipped with latest ; any class of aircraft work under- ompt deliveries; best work.—Apply THE AEROPLANE, 166, Piccadilly, W.1

l and Coppersmiths' work wanted. l firm is open to receive inquiries for ckets, fairings, and pipework, etc. k and prompt deliveries guaranteed. . 3415, THE AEROPLANE, 166, Picca- .

immediately, Gnome engines and ts of same. Must be in first-class . Spot cash paid.—Ruffy, Arnell, ann Aviation Co., Ltd., Noel Road, 3

Aeroplane Propeller Cuttings, and walnut. Any amount for x No. 3423, THE AEROPLANE, 166, W.1.

Twill Cuttings, in any quantity. erage size, quantity and price to Aylen, 38, Sun Street, London,

Wanted.—Must be high class instru- n fast lens; ¼ pl. or smaller pre- rowne, 7, Eden Street, London,

MODELS.

Clarke and Co., Ltd., Model De- Hampton Wick.—Though we are ith full-size aeroplane parts orders, uild models as we did in 1906. Sop- nes, etc., in Stock.—Send 3 stamps llustrated List, 120 items and 14 ertain metal goods are out of stock.

FOR SALE.

Tarpaulins.—Waterproof khaki sheets for sale; also few second-hand railway truck tarpaulins; London works.—For prices and particulars write Johnston, 12, Broughton Road,

MISCELLANEOUS.

MAKE MONEY BY WRITING.

£50 PRIZE. Send postage (2d.) for particulars and copy of "How to Earn Money while Learning How to write for Newspapers and Magazines." Practical and Comprehensive Correspondence Courses—Fiction and Articles, etc. Expert Literary Directors. Constructive Criticism. Beginners taught how to make work saleable. Exceptional testimonials. Address "Editorial" (Dept. E.M.), 22, Chancery Lane, London, W.C.2.

AVIATION

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Engineer in Aeronautics. Demonstrations from complete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTITUTE LTD.,

10, Heddon Street, Regent Street, W.1.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road, Manchester.

FULL UP NOW WITH WAR WORK

but inviting your enquiries for After War Requirements



RANSOME & MARLES BEARING CO. LTD.

NEWARK-ON-TRENT London: 63 Qn. Victoria St. E.C.4.

MISCELLANEOUS ADVERTISEMENTS.

SPECIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEM in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1 6 pe For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, Londo

PATENTS.

PAGE & ROWLINSON, Chartered Patent Agents (Consulting Engineer, Mr. S. E. Page, A.M.Inst.C.E.), 27, Chancery Lane, London, W.C. Tel. 332 Central.

Henry Skerrett, Chartered Patent Agent, 24, Temple Row, Birmingham.—Patents, trade marks, and designs.

SITUATIONS VACANT.

Several Good Engineering Draughtsmen required by large controlled firm in Tyne district, manufacturing aircraft. Experience of aeronautical work desirable, but not essential. Good remuneration offered to competent men. No one on Government work need apply.—Write, stating age, experience, and qualifications, to your nearest Employment Exchange, mentioning this paper and No. 3443.

Draughtsmen—Jig and Tool—wanted for high-class aero engine repetition work. Must have good machine shop and some drawing experience. Good salary and overtime pay for keen, practical, and intelligent men. No juniors need apply. Persons already employed on Government work will not be engaged.—Apply to nearest Employment Exchange, mentioning this paper and No. A4882.

Required, at once, **Press Tool Makers,** open and Pillar tools, one hour from London, good rate of pay. No person already engaged on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3467.

A Large Firm, London, N.W., has several vacancies for aeroplane erectors and assemblers, used to accurate and high-class aeroplane work. No one living more than 10 miles away or engaged on Government work need write to Box 3360, The Aeroplane, 166, Piccadilly, W.1.

Aeroplane Draughtsmen.—Wanted by old established aeroplane manufacturers several first-class draughtsmen, with previous experience of aeronautical work preferred.—Apply, with full particulars of qualifications and salary required, to your nearest Employment Exchange, mentioning this paper and No. A4697. Men on Government work need not apply.

A large London firm connected with aviation has a vacancy for a first-class **Outdoor Representative** who must be exempt from military service. Invalided flying officer will be given preference.—"Representative," Clayton's Advertising Agency, 52, Shaftesbury Avenue, W.1.

Inspectors, first-class, wanted for aeroplane engine erection. No one engaged on Government work considered.—Apply at your nearest Employment Exchange, mentioning this paper and No. 4991.

Wanted by a large London Aircraft Engineering works a number of good **Mechanical Draughtsmen**—men with previous aeronautical experience preferred. Write stating age, experience and salary required. No one will be engaged who resides more than 10 miles away or who is on Government work.—Write Box 263, Sells, Ltd., 168, Fleet Street, E.C.4.

Aircraft Construction. Applications will be immediately entertained for a thoroughly experienced **Metal Worker** to supervise parcel assembly of tinsmith details and final erection. No one on Government work will be engaged.—Apply, in first instance, to your nearest Employment Exchange, mentioning this paper and No. 3479.

Wanted immediately, Head Foreman for Aeroplane Factory. Must be thoroughly experienced in wood details, plane assembly and erecting. No one on Government work will be engaged.—Apply, in first instance, to your nearest Employment Exchange, mentioning this paper and No. 3478.

RADIATOR AND SHEET METAL WORK
UNION WORKMEN
(BEST RATES PAID)
WANTED
No one already on Government work, or resident more than ten miles away will be engaged.
Apply—
GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.3

SITUATIONS VACANT.
AERO ENGINE WORKERS WANTED
FITTERS, TURNERS, MILLERS, also TOOL ROOM HANDS.
No one on Government work or resident more than 10 miles away will be engaged
APPLY—
GILLETT, STEPHEN & Co., Ltd.
BOOKHAM, SURREY.

Aeroplane Work. Firm taking up aeroplane body construction requires thoroughly skilled man to superintend. One accustomed to working from prints, erection of jigs, etc., and capable of teaching new workers. No one residing more than 10 miles away or engaged on Government work need apply.—Apply, with full particulars, to Bertram Ison, Ltd., 694, Seven Sisters Road, Tottenham.

Woodworking Mechanic (Foreman) wanted, thoroughly used to Spindle, for Government Contractors in the district of London. Top rate pay. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3480, The Aeroplane, 166, Piccadilly, London, W.1.

A large number of Fitters with experience of aircraft work are required for London aeroplane factory. Full rate and war bonus. No one living more than 10 miles away or on Government work will be engaged.—Write Box No. 268, Sells, Ltd., 168, Fleet Street, E.C.4.

SITUATIONS WANTED

Works Manager, or position of tru practical engineer, invaluable experienc aeroplanes and seaplanes. Tactful, getic, methodical organiser, accustom latest service methods and capable of ec cally increasing production.—Box 328. Aeroplane, 166, Piccadilly, W.1.

Works Manager or Assistant, pr engineer, with thorough knowledge of plane and seaplane construction is take up responsible position with firs firm. Good organiser, modern metho tactful controller of labour.—Box No. The Aeroplane, 166, Piccadilly, Londo

As Manager or Mill Foreman, expert j machinist, thoroughly understands the mical conversion of lumber to meet requirements. Good organiser and M of large bodies of labour. Large mil ferred. Wages, £300 yearly; progres Box No. 3436, The Aeroplane, 166, dilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially air-dried timber as supplied to leadi structors in Britain and the Continent. Spruce, Ash, Poplar; Hickory ar Skids; Three-ply; Thin Cedar and Ma for Floats; Walnut for Propellers.— Mallinson and Sons, Ltd., Hackney 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in a ties, suitable for Aircraft Work. Deliv stock.—John MacLennan and Co., 3 gate Street, London, E.C.1. (See Ad ment Page IV. of cover and Buyers'

Aeroplane Seats to any drawing or s tion. Prompt deliveries.—F. C. C Cane Works, 9, Fisher Street, Nottin

Aeroplane Seats. We can give quick of cane seats, A.G.S. 264 or other p guaranteed pass inspection. Write anything required in cane work.—The brook Company, Leicester.

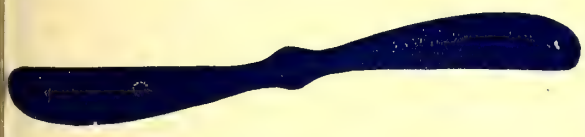
The Civil, Nautical and Mechanica gineering Co., Ltd., Cowper Road, W don, 'phone Wimbledon 1493, **can from stock** the following fittings, to being unsold: De H6 Stamping Nos. 9296, 9332, 9807, 9843, 9850, 9125 De H4 Part Nos. 6542, 6126, 6284; 13095, also MF Part Nos. 2404, 951 1913, also 4 BA eyebolts, our a pattern. Enquiries solicited for the and general machine and presswor plain milling, cutter grinding. attention and quick deliveries.

The General Aircraft Co., 6, 8, 10 Road, Hammersmith. Thousands of from stock No. 6372. Stampings fo Nos. 6334, 6142, 6326 and 7, 6328 6356, 6, 7 and 8, 9338 and 9, 13337, and D H9.

Presswork to Drawings. Quick deli Write for quotation.—Palmerston W 51a, Russell Road, Forest Road, Wa stow, E.17

We undertake Contracts for light engi work. Ask for quotation.—R. L. Du Co., Aeronautical Engineers and facturers, 673, Romford Road, Manor E.12.

CHAUVIÈRE'S
Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone Kingsbury 104.

OXY-ACETYLENE
WELDING & CUTTING
PLANT



The Latest and Best Type of Plant for this Process as installed by the leading Aircraft, Shipbuilding and Engineering Firms, H. M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C. ATOZ G.B.

Carbide Flarelights. Handlamps.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "Flamma, Vic, London." Telephone: Victoria 4880.

ACCURACY



J. H. ROBERTSON & Co
AERONAUTICAL ENGINEERS

Tel. REGENT 3996 LONDON OFFICE: 1, ALBEMARLE STREET. W.1

All classes of machining. *FINE LIMIT WORK.*

JIGS, GAUGES, AND SPECIAL TOOLS.
TURNBUCKLES, EYEBOLTS A.G.S. SPECIFICATION.
STAMPINGS, AND HIGH-CLASS STEEL FORGINGS,
PRESS WORK, &c.
OVERHAULING AND REPAIRS TO ALL TYPES OF AERO MOTORS.
PROPELLERS FOR ALL TYPES OF AIRCRAFT.

CRANKSHAFTS, PISTONS, GUDGEON PINS, VALVES A SPECIALITY.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams: "*Airengine, London*" *Telephones:* *Gerrara* 8165; *Richmond* 1293.



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W.1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passage, London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. Gordon Green

WEDNESDAY, APRIL 10 1918.

Vol. XIV. No. 15 THREEPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

THE NORMAN THOMPSON FLIGHT CO. Ltd.

ESTABLISHED 1909

Telegrams—SOARING, BOGNOR
ENTIFLYTE CHARLES, LONDON

Works—MIDDLETON, BOGNOR

CONTRACTORS TO THE ADMIRALTY

Telephones—BOGNOR 48. GERRARD 7385

London Office—
DEWAR HOUSE, 11, HAYMARKET, S.W.1.

DESIGNERS AND MANUFACTURERS OF FLYING BOATS AND LAND PLANES

Auster FOR **Aero-shields**

LONDON. BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE

NON-POISONOUS

DOPE

SEE ADVERT. INSIDE.

TELEPHONE: OLDBURY 111. **ACCLES & POLLOCK, LIMITED.** TELEGRAMS:- ACCLES OLDBURY

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

TRIPLEX Safety GLASS

See Advt inside

. THE .

ENGINEERING TIMBER CO. Ltd.

11, Victoria Street, London, S.W.

J. E. HUSON, Managing Director.

Telephone: Victoria—5073, 4210
Telegrams: Entikosil, Vic. London.

SILVER SPRUCE

ASH

WEST VIRGINIAN SPRUCE

WALNUT

MAHOGANY

GLASGOW:

67, HOPE STREET.

Telephone: Central 3273.

Telegraphic Address: Entikosil, Glasgow.

PARIS AGENCY:

6, RUE DE HAVRE, PARIS.



EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  **AS A DRUM.**

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:
30, Regent Street, Piccadilly, S.W.1.
Wire—"Ridleypren, Piccy, London."
" Phone—280 Gerrard

Works
5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.
Telephone—Willesden 2346 & 2347.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelman

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY



CONTRACTORS TO H·M·AIR MINISTRY

Designers & Manufacturers of Aero Engines & Aeroplanes

The
SIDDELEY-DEASY
MOTOR CAR CO Ltd
COVENTRY

Luxurious Motor Carriages
Aero Engines
Aeroplanes



Godbolds

CONTRACTORS TO THE
ADMIRALTY & WAR OFFICE

C. G. Spencer & Sons
LIMITED.

THE
KITE BALLOON AND
PARACHUTE EXPERTS

AERONAUTICAL APPARATUS
OF EVERY DESCRIPTION.

ROPES, FABRICS AND EQUIPMENT.

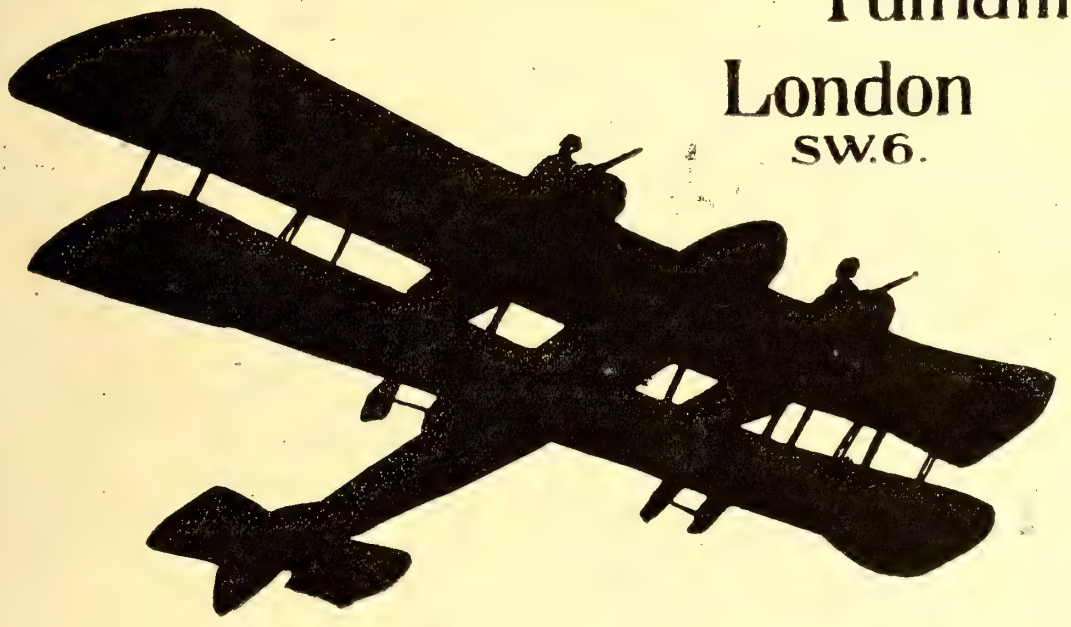
THE PIONEER FIRM.
FIRST IN 1835. FOREMOST TO-DAY.

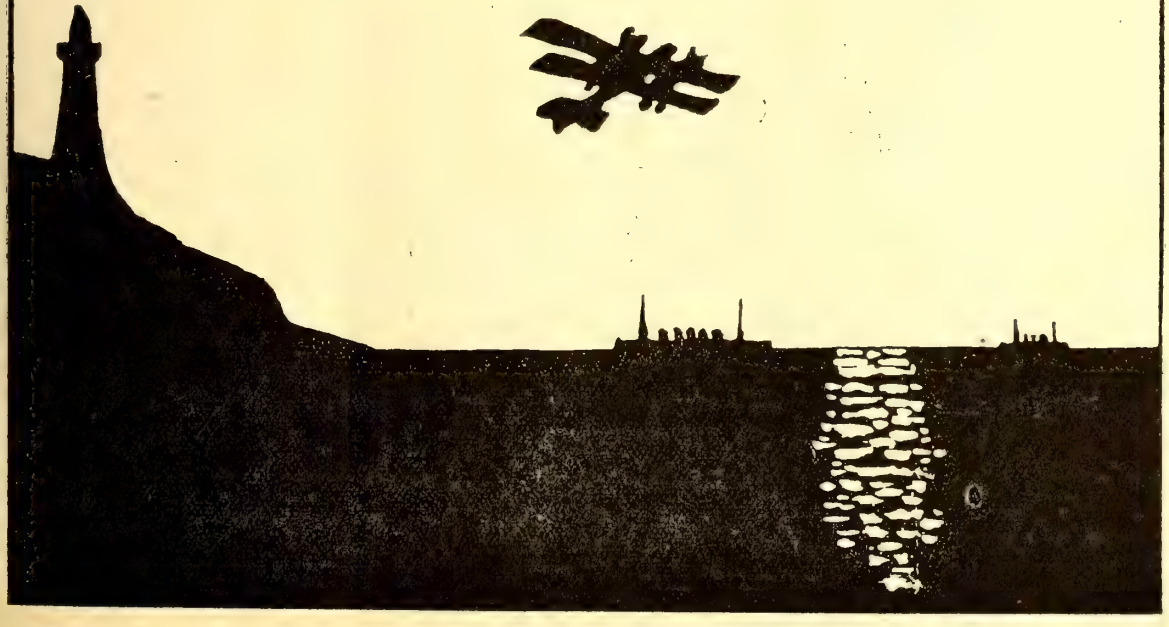
Works: HIGHBURY, HACKNEY, BRIXTON, CLAPTON
Head Office: 56a HIGHBURY GROVE, LONDON, N.
'PHONE: DALSTON 1893. TELEGRAMS: "AERONAUT, LONDON."

AERONAUTICAL ENGINEERS TO H.M. GOVERNMENT.

THE REGENT CARRIAGE Co. Ltd.

Fulham
London
SW.6.





KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Works: Blackhorse Lane, Walthamstow.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 5456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

A. V. ROE & Co., Ltd.

Aeroplane Constructors.

NEWTON HEATH
MANCHESTER.

Telephones—
City 8530 and 8531.

Telegrams—Triplane.



HAMBLE,
near SOUTHAMPTON.

Telephone—
Hamble 18.

Telegrams—
Roe, Hamble.

AEROPLANES

AND

PARTS.



166, PICCADILLY,
LONDON, W.1.

Telephone—
Gerrard 3186.

Telegrams—
Senalpirt, Phone.

CODE: A.B.C.: 5th Edition.

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 8s. 10d. 6 months, 7s. 7d.; 12 months 15s. 2d.
Foreign, 3 months, 6s. 0d; 6 months, 10s. 0d.; 12 months, 20s. 0d. Canada, 1 Year, $4.70c.
U.S.A., 1 Year, $5.20c.

THE DEVELOPMENT OF THE R.A.F.

One of the most surprising developments in the formation of the Royal Air Force is the appointment to high commands of a number of senior officers of both the Navy and Army who have hitherto shown no interest in Naval or Military Aeronautics. It is, of course, highly gratifying that so many officers of such considerable seniority should thus begin to take an interest in Service aeronautics, albeit perhaps a trifle late in life for them ever to understand the details of the aerial profession as a sailor understands the details of ship work or as a soldier understands the duties of a regimental officer. The human brain is not in its most elastic or receptive state after the age of forty.

In the ordinary course of affairs one would have expected that the commands of large areas and the important administrative jobs would have devolved naturally on those able officers who have been responsible for all that is good in the R.N.A.S. and R.F.C. And, be it noted, apart from the high *moral* of the personnel and the individual gallantry of pilots, there has been much excellent work done in both Services.

It is evident, however, that the only persons in the Flying Services who would be capable of taking over the big commands would be the R.F.C. Brigade Commanders who have done such magnificent work in the field. And it is equally evident that it would be impossible to spare such officers from their active-service commands. Therefore it follows that the big home commands must go to Army officers of the seniority necessary to fit them for such commands.

An Unfortunate Circumstance.

The unfortunate aspect of the matter is that such officers will, presumably, be of higher rank than the Brigade Commanders in the field, who are the very men who have built up the Corps from nothing.

It is true that these Brigade Commanders began the war as captains in the Army and temporary majors—except a few who were brevet majors—and that the officers who now come into the R.A.F. were probably lieutenant-colonels or brigadiers at that time, so that on Army seniority they are automatically of higher rank than any R.F.C. officers. Nevertheless it seems a pity that in this entirely new Third Service, in which, above all others, promotion by merit instead of by seniority would be justified, seniority in another service should count for so much.

However, such a state of affairs appears to be unavoidable, and consequently, although one sympathises entirely with the feeling which these appointments have raised on the Corps, one cannot agree with much that is said on the subject. Justice to the individual may be met very easily by promoting the present R.F.C. Brigadiers to such rank as will place them on an equality with the "imported" General Officers. And in any case the rapid growth of the R.A.F. makes it appear that such promotions are bound to occur before many months are past.

Imported Officers.

The following notes on the question of imported officers, written by a civilian who has done excellent work for one of the Flying Services, indicate quite lucidly what is felt by those who have had much to do with building up both Services from their small beginnings in the early days of the war. One publishes these notes because it is well that what is felt by many should find expression, so that those in authority may consider how best such feelings may be allayed. Here then is the hypothesis of the problem:—

The New Service and Its Staff: A Study in Psychology.

The feeling of the civilian who is now dressed as a soldier and who has come into the Air Force towards the regular officer, be he either sailor or soldier, is one that seems little understood by those that sit at the head of the new Service.

Like so many things that are psychological, most of them understand but little of this all-important matter, but the subject is one that affects the whole Air Force right through, and the sooner the problem is appreciated and understood the better for all.

Let us first of all regard the traditions of the Air Force as it is to-day and see on what they are based. They are based on performances done during this war and on little that was done before. It owes its glories and its triumphs largely to the civilian who is "dressed up as a soldier," for to pretend that the airman or A.M., dress him or train him as you will, is a soldier is not to understand the beginning of the subject.

We must go back to before the war and trace a little of the early history of aviation and see how it was all started.

First of all we see the civilian appreciating the possibilities of the whole question of aircraft, and more especially its possibilities from the military point of view. We see civilians, in the form of the Aero Club, offering to lend machines to the Army for manœuvres, and being turned away, as not wanted. We see civilians having to teach the first sailors to fly out of their own pockets.

I point this out, this mind of the official, because as a nation we pay people to see that we are kept up-to-date in all machineries of War, and yet such is imagination in high places among the regular and professional soldiers and sailors that on a matter that was almost entirely a military problem the civilian had to push the Services into seeing what was patent to all.

Now when aviation simply had to be taken up, as an unpleasant new and nasty thing, by the authorities, they started it with a set of regular officers.

I want to note carefully what was the type of officer that they got. They were, I maintain, mutineers against the stifling of initiative in the Army and Navy. They were those who wanted to get away from the ordinary to something with scope and imagination. They were pioneers of thought in the Services.

Small wonder then that the officers who took up flying at the beginning were of the best that there were. Small wonder that of those who remain to-day most of them are beloved and adored by all.

And then came the War, and to this band of "mutineers" (used in its best sense) came into the corps the civilian trying to do his bit, looking to this picked body of officers for example and finding in them all that they wanted to copy, all that was good.

Later others came in besides, either from civil life direct or from regiments. To-day they are chiefly civilians who transfer from other units, but they all come in from the bottom and work their way up, becoming merged in the Air Force.

Now it is not long before an officer coming into the Corps realises that the foundation of the whole structure of the

Flying Services rests on an entirely different basis from that of the Army or Navy.

Take for instance discipline. It may strike one as odd to say that discipline is not essential in the Air Service, but such is the case. All that is really necessary is good behaviour and obedience, which is not got by discipline alone.

The reason for discipline is a military one. It is necessary when one wishes to make a body of men act as a machine, without thought of their individual selves. That is the basic theory of the whole thing, and that is why no body of troops without it is any good in actual fighting, for, under fire and in trying circumstances, they would not act as a unit and a machine but as a rabble.

Now discipline is instilled into men by a sort of imitation of war, that is by drilling, manœuvring, etc. In the Flying Services it may be very pretty to see everyone in a nice line to be looked at, but the moment actual work starts, combined action, as one understands it in the Army, ceases, and it is each man to his individual job, be he a flier or a mechanic.

In no way does regular Army discipline help him or the war. It makes him neither a better flier, a better mechanic, nor a better rigger. To say that only under discipline will he obey his superior officers is an insult to his loyalty and intelligence. Businesses go on without rank and gold braid. Orders are obeyed and work is done without discipline, as the word is understood, in the Services.

Mark, therefore, that one difference, chosen haphazard between the two Services, the old and the new, one in which discipline is a *sine qua non* as a military essential, the other where it is pretty, no doubt, but from a utilitarian and military point of view largely waste of time.

Now the officer who comes into this new Service from the bottom soon understands the whole difference and falls into line. But the "Regular," brought up in a different school, unless he begins at the beginning, does not see that whereas in the Army he and his men were one inseparable fighting unit, now he is an individualist, as also is every air-mechanic under him. He is either a flier apart, who has to do his job away from everyone, or else he is an equipment officer, who is practically a sort of foreman or business manager, helping and encouraging men in their individual work, and understanding it.

Unless a Regular officer starts at the beginning in the Flying Services, therefore, he really does not know how to treat the men he finds there, who are tradesmen dressed up as soldiers, pursuing their useful calling for the sake of the fliers. It is not the smallest use ordering them about like infantry soldiers at their skilled work, they simply don't understand it, and laugh at it secretly. Nor do the A.Ms. understand an officer who looks upon them all as of one make to do exactly what they are told.

Having established one or two examples of the difference between the Services from top to bottom, I do most earnestly put forward the suggestion that it is not in the best interests of the Air Force that officers of high rank from either of the old Services be put straight away into high positions of command or administration in the Air Forces, without any knowledge of even the most elementary facts about the Air.

That is what has been and is being done to-day, and it is causing throughout the Service a bitterness of feeling against the Regular Service officer that never existed when they had to work their way up, and which never would have existed had it not been for this mistake.

The glib answer that one must have people in high administrative positions with knowledge of staff work and experience is, of course, an insult to the intelligence of the meanest. Is a Staff officer brought in from either Service as a Colonel to "direct operations" to gain his experience at the expense of the lives of fliers and of wrecked machines, when any Flying Officer could gain the Staff experience by being attached to units of the Army and Navy to learn the use of the various arms? It would be as logical to put an R.F.C. officer in command of a battalion, because he has a knowledge of air work!

Is the Army so richly endowed with brilliant Staff Officers that it can spare G.S.Os. for use with the R.F.C.? If it is not, and experience tells us so, then is the R.F.C. to be saddled with the cast-offs?

Let there be an end to the importation into the Air Force of the Regular Officer of the old type, with all his intolerant ways. At any rate, let him not be imported direct into high places. Let him start at the bottom.

The Air Force has been built up without them or their traditions, and now, when others have done the work, let them keep away, and not exploit the New Arm for their own advancement, though to the detriment of the Air Force, and its good temper and welfare.

There is sufficient talent in the Air Force without going outside for it and pretending to find it in Regular Staff Officers. We have seen quite enough of the old Army "Club" to look with anything but the gravest suspicion on the start that is being made in the taking of big positions in the New Arm by this "mutual admiration society" of exalted Regular Officers.

The Benefit of Explanation.

A little explanation of an official action, or an order, will frequently do much to allay irritation or bad feeling which is caused by action without explanation. One does not suggest for a moment that subordinate officers or men have any prescriptive right to any such explanation. One has too much respect for the basic principle of discipline—as contained in the line, "Theirs not to reason why, theirs but to do or die"—to suggest that a commanding officer, or a controlling Council or Staff, should issue on principle an argumentative explanation of all orders.

Such a custom would be as fatal as the introduction of the Bolshevik principle which introduced Soldiers' Committees, the election of officers, and the abolition of capital punishment, and so brought about the disintegration of the Russian Army, gave complete and easy victory to Germany in the East, and left the enemy free to bring about his present concentration against the civilised Allies in the West. Such a custom would produce a Service of sea-lawyers, ever ready to argue with their superior officers. The great thing to instil into any fighting force is the ancient maxim, "Orders is Orders."

Nevertheless, when great changes are afoot it seems well on occasion to issue to all those concerned some sort of explanation of the why and wherefore of things. Something in the nature of what a Staff Officer might call "an appreciation of the situation," together with a discussion of the line of operations upon which the High Command has decided, would not merely allay irritation, it would definitely tend to promote loyalty to the new scheme, and would—as in the case of the formation of a new body such as the Air Force—distinctly strengthen *esprit de corps*. At any rate, it would do so to a greater extent than by making everybody companions in misfortune without explanation, either by putting them all into a new and badly designed uniform or by appointing them to serve under strange officers of alien ideas.

A Few More Points Explained.

One has endeavoured in the first part of this article to put forward, without any knowledge of the official reasons, an explanation of some appointments which are troubling Air Force officers and men. Possibly the explanation is quite wrong, but at any rate it seems reasonable, and would probably satisfy most people in the Force if given to them officially.

Similarly on the question of Staff officers it might be well to explain matters. There are those who think that any "office-job" in the Air Ministry could be filled by any wounded or crashed or nerve-strained flying officer. Such people object strenuously to the importation of maimed or invalided Army officers without flying experience to these sit-down jobs.

Whether it is the official reason or not, one cordially agrees with the official action in this instance. The best pilots are by no means distinguished for their brains. And the pilots with brains frequently suffer extremely from what our would-be descriptive writers call the "airman's temperament"—which generally means a mixture of nerves, self-opinion, lack of discipline, and inability to appreciate the beauties of co-ordination—except perhaps in a chorus, from the stalls.

Staff Needs.

Such officers, for all their gallantry and self-sacrifice, would be perfectly hopeless in Headquarters jobs. It would be far better to keep them out of the office on full pay for the term of their natural lives than to try to put them to any useful purpose on the Staff. It is notorious in the Army that, apart from the staffs in the

field, R.F.C. staff work, where it has come in touch with regular Army work, has been on the whole rather like this world before the second day of the Creation. One is fairly safe in ascribing this to the endeavour to employ deteriorated aviators on jobs which distinctly demand a *mens sana*, even if a *corpus sanum* is not necessary.

The Staff officer needs to be first and foremost a trained soldier. One may leave Naval officers out of the question because the Navy has never had a Staff in the proper sense, and only had a War College for about five minutes before war broke out. Therefore the fact that sea war is an exact science like land war has not yet had sufficient time to percolate to the intelligence of a sufficient number of sailors to permit the production of Naval Staff officers as a distinct species.

That being so, the only available Staff officers for the Air Force must come from the Army, with perhaps a few brilliant exceptions, who happen to have been born for the Staff. Any good regimental officer is fit for the work. A good regimental adjutant is better. And, of course, a Staff College graduate is simply a gift from Heaven where the Air Force is concerned.

Apparent Hardships.

It may seem hard that those who have borne the burden in the heat of the day, let alone those who have been frost-bitten in the higher aerial levels at night, should not have the comfortable sit-down jobs at home when they are past flying. But Staff work, like Army reconnaissance, must be done, no matter who suffers. And a job on the Staff is, or ought to be, the hardest work in the Force.

One knows from personal observation that R.F.C. Brigade Staffs in the field work far longer hours on far more monotonous and exigeant work than do any of the people who fight or fly, and that many of those who appear to have cushy jobs at home work equally hard. If every one of those at home worked as hard and as efficiently, the personnel at the Hotel Cecil could be reduced by fifty per cent., the speed of the work would be doubled, and we should get along with the war much quicker. Also it would be necessary to delete the nickname of the Hotel Bolo.

Therefore one is entirely in favour of importing trained soldiers to the technical Staff-work—as distinct from the work of the technical staff, which is quite a different thing. Such officers will set an example of system and method which will ultimately influence the whole Force for good, while in the meantime their own work will be properly done.

Unfathomed Reasons.

There is a certain curiosity concerning some recent appointments which will doubtless be satisfied in course of time. For instance, one sees in the "Gazette" of April 5th that Vice-Admiral Hutchison, C.V.O., C.M.G., R.N., comes into the Air Force as temporary Colonel and honorary Lieutenant-General.

Admiral Hutchison does not appear in any records of Naval or Military aeronautics as having displayed any intense interest in the latest development of war. It may therefore seem strange that he should come in as the equal in rank of Lieut.-General Henderson, who has, at any rate, been intimately concerned with flying since its very early days. And it seems stranger still that he should be superior to Commodore (now Brigadier-General) Sir Godfrey Paine, and to Major-General Sir Hugh Trenchard, who between them built up the whole fabric of the Air Force from its foundations.

Doubtless it was necessary for the Navy to have someone in the Air Force as an "opposite number" to General Henderson. But if so, why Admiral Hutchison in particular? He may be a magnificent officer. If so, it seems strange that the Navy can spare him. And if he is not, then one questions whether he can be of any use to the Air Force.

The appointment of Colonel Lambe, C.M.G., D.S.O. (Captain R.N.), in the same "Gazette" is of similar interest. As a senior Commander R.N., Colonel Lambe had the unpleasant experience of losing his ship, the seaplane-carrier "Hermes," while crossing from Dunkerque to Dover early in the war. The fact that the customary court-martial did not follow gives one to suppose that the circumstances were entirely satisfactory. Thereafter he commanded a land force of the R.N.A.S., which was a kind of out-station of that Dover Patrol which has from time to time been subject to so much criticism.



With the Royal Flying Corps on active service. The adjustment of a heavy bomb on a de Havilland. A Nieuport fighter is seen in the background, apparently ready to start as a guard to the bombing machine.

Much has appeared in the press about the gallantry of the aviators of that detachment, but it is, of course, impossible to relate the inner history of their affairs until after the war. None disputes the gallantry of the officers and men, which has been beyond all praise, but none the less the appointment of the senior officer of their station to be a Brigadier in the Air Force will come as a surprise to many of them, who regarded him as being essentially a sailor.

One mentions these two appointments merely because they happen to occur in the "Gazette" as one writes. Doubtless there are others to which a little explanatory dissertation might be of value. If something in the nature of the citation which accompanies the award of a D.S.O. or a Military Cross were attached to each of such appointments in the "Gazette" it might aid materially in promoting confidence and *esprit de corps* in the Air Force.

In the Army one would expect nothing of the kind, but in such a miscellaneous and hermaphrodite affair as the R.A.F., composed as it is of sailors, soldiers, and civilians, more or less happily mingled, and commanded promiscuously by active—or passive—officers of either the Navy or Army, one feels that anything which would tend towards the consolidation of the Force into one homogeneous whole would be a step in the right direction. The Air Minister is said to pride himself on his freedom from ancient prejudices and obsolete traditions. Perhaps the revolutionary principle of starting off otherwise inexplicable appointees with an explanatory label tied to the lapel of their nice new tunics may commend itself to him.—C. G. G.

THE END OF THE R.N.A.S.

The following obituary notice—apparently officially inspired—of the work of the Royal Naval Air Service was published in the daily newspapers of April 6th:—

The Royal Naval Air Service, which is now part of the Royal Air Force, has achieved a glorious record of service during the war. In March, 1914, it consisted of 125 officers and 500 men; and the number of seaplanes was 62. Since then the strength of the Force has been immensely increased, and it has become splendidly efficient.

When the British ultimatum to Germany expired the R.N.A.S. instantly began active operations, and the dawn of August 5th, 1914, saw our seaplanes and airships on patrol. Throughout the embarkation of the British Expeditionary Force it did invaluable work in patrolling the Straits of Dover and the English Channel on the look-out for hostile aircraft, and from that time onwards it has never failed whenever British naval and military forces have been engaged.

In the early stages of the war the R.N.A.S. provided crews for armoured cars, raided Cuxhaven, attacked Zeppelin sheds, dropped food and medical stores into Kut, bombed the German warship "Königsberg," fought enemy aeroplanes returning from raiding this country, identified enemy cruisers in the battle of Jutland Bank, destroyed Zeppelins, and served as "eyes" for the Grand Fleet.

In June, 1915, Flt. Lt. Warneford gained his V.C. by bringing down a Zeppelin near Ghent. In August Service aircraft attacked a Zeppelin returning from this country and destroyed it. In all, three Zeppelins have been accounted for; and in 24 enemy aeroplanes raids on London and other places 22 of their machines were put out of action, while two others were reported probably to have shared that fate.

On the Western front, valuable work has been done by the squadrons attached to the Royal Flying Corps, and tribute has already been paid to their operations in the great battle now in progress.

In December, 1916, a squadron, working with the Royal Flying Corps, brought down 14 enemy machines, and Sir Douglas Haig expressed his appreciation of its fine work.

On one occasion a seaplane patrolling on the French and Belgian coasts sighted two German destroyers and attacked one with bombs, damaging the deck and stanchions. The pilot dived to 1,000 ft., and attacked the vessel with a Lewis gun, firing a tray at a distance of 300 yards, and scoring hits on the deck and forepart.

There have been frequent single-handed fights with three, four and five hostile machines, and in a number of cases one and sometimes two of them have been destroyed. A noteworthy performance was that of an aviator who, in a fight with two enemy aeroplanes, was hit twice in the right arm. Finding that he was losing much blood, he had to hold the artery with his left hand and fly the machine with the stick between his legs, afterwards making a safe landing.

A memorable fight was an encounter by a British pilot with five hostile machines, at 13,000 ft., off Middelkerke. He attacked them single handed, and four retreated. Into the fifth, a Fokker, he fired 20 rounds, causing it to dive steeply into the sea at Ostend. The pilot found himself close to a large Aviatik, into which he fired the rest of the tray, and made it dive towards the coast. On his way home the same pilot encountered another Aviatik, and, diving at it from 13,000 ft., forced it to descend.

Towards the close of last summer two flights of five Sopwith scouts encountered approximately 25 enemy machines between Ostend and Ghistelles, and a general engagement took place. Our machines completely broke up the formation and a number of the enemy's aeroplanes were either destroyed or badly damaged. Engaging three hostile machines consecutively, one British aviator shot two down, completely out of control, and, possibly a third, while five others were accounted for. All our machines in several other combats returned safely, though five of them were badly shot about, one having 113 bullet holes and both petrol tanks pierced.

Throughout the whole of the operations in the Dardanelles Peninsula the air work was undertaken by the R.N.A.S. The Berlin-Constantinople railway, largely used for the transport of war material, was frequently bombed, forage stores and munition dumps being fired and bridges badly damaged in spite of active gunfire; while trains in motion were bombed and attacked with machine-guns.

The Zeitumlik Powder Factory at Constantinople was bombed, and frequent visits were made to Adrianople, involving flights, in some cases, of over 400 miles. Crop burning was another operation, and enormous damage was inflicted with incendiary bombs. Attacks on enemy battleships, destroyers, and transports in the Dardanelles were frequent.

A noteworthy performance was the attack on the "Goeben" on July 8th last by a large Handley Page aeroplane commanded by Squadron Commander K. S. Savory. This aeroplane flew to Mudros, covering approximately 2,000 miles in 31 hours 34 minutes—a distance which is believed to be easily a world's "record" for a cross-country journey, and also for the weight carried. In his attack on the "Goeben" the aviator made a night flight, arriving over Constantinople at midnight, and afterwards circled over Stenia Bay. The first salvo was followed by a heavy explosion and a big fire. The aviator then proceeded to the upper waters of the Golden Horn and attacked the ss. "General," stated to be the German headquarters, making two direct hits on the after part of the ship. Then steering direct for the Turkish War Office, he made two direct hits on the centre of the building, and returned safely after a seven hours' flight.

Particular attention was paid on one occasion to Chanak in consequence of information which had been received that the Kaiser and his entourage were paying a visit. In spite of very unfavourable weather, several machines set out, but only one succeeded in reaching the objective, and dropped a number of bombs on the town. On his return journey, the aviator struck the side of a mountain in the darkness and the machine caught fire. The pilot, although severely injured, was able to climb out of his machine and was found next morning by a Greek shepherd.

During 1917 the following decorations were awarded to R.N.A.S. officers:—

D.S.O., 29 (four with Bar)
D.S.C., 112 (one with two Bars, 16 with one Bar).
Croix de Guerre, 26 (two with palm, six with star)
Chevalier of Legion of Honour, 12.
Other foreign decorations, 13.

Two V.Cs. have been awarded—one to Flt. Lt. Warneford, and the other to Wing Comdr. Bell Davies, for bravery in the Dardanelles.

LORD ROTHERMERE'S MESSAGE.

The following message has been addressed by Lord Rothermere to the aerodrome workers of the United Kingdom:—

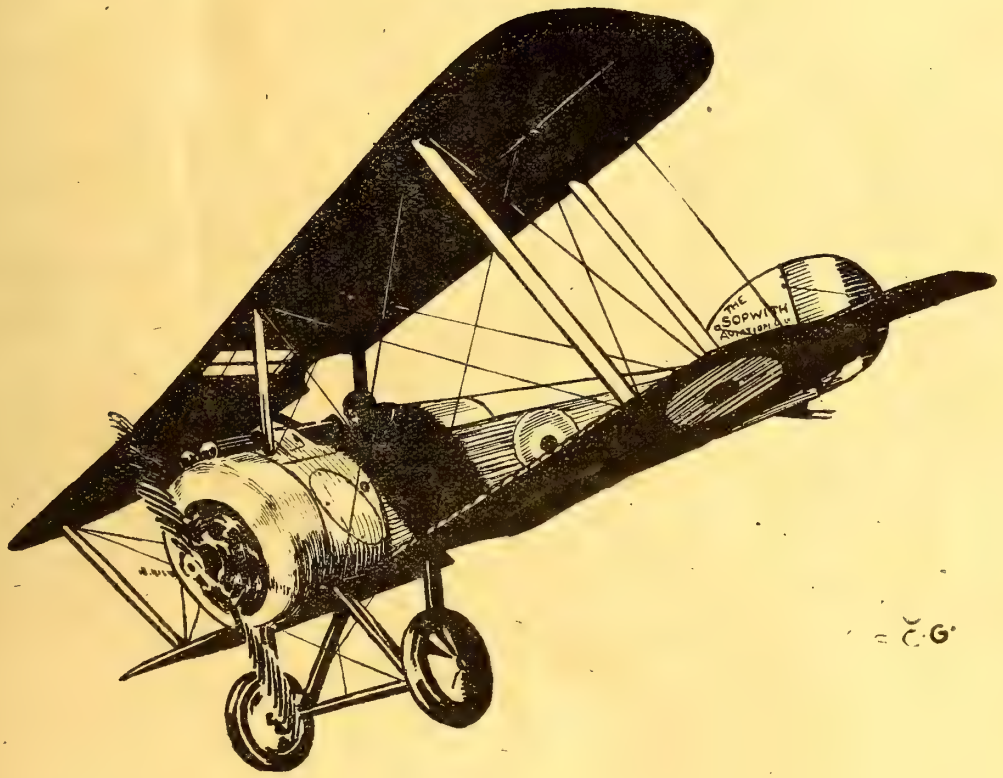
Our splendid airmen during the present battle have accounted for 339 of the enemy's aeroplanes, and have killed very many of the enemy by bombs and by machine-gun fire. They are working night and day for their country.

On their behalf I ask you to do everything you can to hasten construction work now being undertaken at your aerodrome.

Each one of you can help. The more aerodromes we have, the more pilots we can train and the more machines we can have in the air against the enemy. Aerodrome construction work is just as necessary as the work of the airman. Without your help he can do nothing, and without his matchless courage and endurance it will be impossible for the armies in the field to withstand the constantly increasing pressure of the foe.

Rothermere.
Secretary of State for the Royal Air Force.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

Paris Office:
21, RUE DU MONT THABOR.

AIR FORCE MEMORANDUM.—No. 6.

ROYAL AIR FORCE: TERMS AND CONDITIONS OF SERVICE.

Every person enlisted into the Royal Air Force is liable for duty afloat or ashore, at any station at Home or Abroad, and may be detailed to any branch of the Royal Air Force; i.e., Airship, Aeroplane, Seaplane, Kite Balloon Work, or any type of Aircraft if considered medically fit for such service; and may be called upon, if medically fit, to go into the air in Airships, Aeroplanes, Seaplanes, Kite Balloons or any type of aircraft.

The selection of a man for service does not imply that he will be trained as a Pilot.

The terms of service in this pamphlet are those in force for the period of the War.

Cadets.

The earliest age at which a Candidate can be admitted to a Cadet Wing, Class "A" (Officers), or Class "B" (Non-Commissioned Officer Pilots or Observers), is 17 11/12 years. Candidates over 30 years of age are not eligible.

Candidates should not be over 6 ft. 1 in. in height, nor over 13 stone in weight, and their eyesight must be very good.

Admission is by selection, subsequent to an interview, by a Royal Air Force Officer detailed for that duty, and after passing the prescribed medical examination.

Civilian Candidates are required to attest before admission. Full instructions will be issued to each selected candidate.

The initial service pay of Cadets entering from civilian life will be 1s. 6d. a day. Those drawn from other Services will continue to draw the pay of their permanent rank in their former Service if more beneficial). They will be provided with uniform, quarters and rations, and while they are in receipt of these initial rates of pay, a special messing allowance of 1s. a day will be issuable on behalf of each Cadet, unless already being paid as a Sergeant, for each day on which a ration is drawn by his unit on his behalf.

After a period of initial training, Cadets will be primarily classified as Class "A" (Flight Cadet) or "B" (Non-Commissioned Officer Cadet), according to merit, character, personality, education and aptitude for leadership. Cadets of Class "A" will be provided with uniform of Officers' pattern to the value of £15. At any time during training, a Cadet may, on the recommendation of his Commanding Officer, be transferred from Class "A" to Class "B" or *vice versa;* and if found unsuitable for any reason, may be reverted to his original service, employed in the Royal Air Force in some other capacity, or discharged and placed at the disposal of the Ministry of National Service.

Cadets on joining will be posted to a Cadet Wing or School for initial training, and will then pass in succession through Schools of Aeronautics and Armament.

From the latter School, they will be posted to Squadrons for instruction in flying, Class "A" Cadets being then graded as Flight Cadets and given service pay at 7s. 6d. a day, also 4s. a day flying pay, whilst actually under instruction. Class "B" Cadets will be graded as Sergeants (Non-Technical Branch) and given service pay at 3s. 3d. a day, also 1s. a day flying pay whilst actually under instruction.

Flight Cadets will mess with the Officers and others with the Sergeants. The special messing allowance will cease.

On passing Flying Graduations "A" and "B," Flight Cadets will be commissioned and paid as Second Lieutenants receiving 10s. a day service pay and 4s. a day flying pay, while the Sergeants (Non-Technical) will be transferred to the Technical Branch as Sergeant Mechanics receiving 6s. a day Service pay, also 1s. a day flying pay. Flight Cadets, on being commissioned, will be credited with £35 towards the cost of completing their uniform and kit. Sergeant Mechanics will retain the full kit issued to them.

On passing Flying Graduation "C," or if required to proceed overseas before such graduation is completed, pupils may be authorised to wear their "wings" and given full flying pay, Officers at the rate of 8s. a day and Sergeant Mechanics at 4s. a day if Pilots and 2s. a day if Observers.

Thereafter, Officers will be eligible for promotion, etc., within the Royal Air Force, which, in the Flying Branch itself, leads to

Lieutenant—12s. service pay, rising to 16s. a day, with 8s. a day flying pay whilst employed on duty which involves flying.

Captain—19s. service pay, rising to 20s. a day, with 8s. a day flying pay whilst employed on duty which involves flying.

Major —32s.
Lieut.-Col. —40s. } a day inclusive.

The above rates are exclusive of free quarters, rations, fuel, light and servant, or allowance in lieu. Officers serving with expeditionary forces also draw a field allowance. Up to and including the rank of Lieutenant, married Officers may receive an allowance for children.

A successful pilot may arrive at his commission with the full pay and duties of a Flying Officer, in from four to six months after joining, and it may be added that in the Royal Air Force the prospects of distinction and of subsequent promotion are unrivalled.

Pension and half-pay rates and conditions have not yet been finally settled.

Applications to join should be made in letter form, stating full personal particulars, to the Royal Air Force Reception Depôt (see next page) which is nearest to the residence of the applicant, or address where he is registered under the Registration Act.

Men.

Period of Service.

(1) Duration of War.

(2) Normal Period; i.e.,

(a) Four years with the Colours and four on the Reserve. Men may, six months before the termination of four years' Colour Service (if recommended by their Commanding Officer and Air Ministry Authority is given), extend their period of Colour Service to complete eight years with the Colours and four years on the Reserve.

(b) Eight years with the Colours and four years on the Reserve. Men in either paragraphs (a) or (b) may, six months before the termination of eight years' Colour Service (if recommended by their Commanding Officer and Air Ministry Authority is given), re-engage to complete their Colour service to qualify for pension.

Fourteen days' leave will be granted to men re-engaging after completing first continuous service engagement, if the exigencies of the Service permit.

Age.

18 to 41 years for Duration of War; the maximum may, in special cases, be increased to 50 years.

18 to 25 years for Normal Period.

Candidates for Normal period of service are subject to examination by a Royal Air Force Medical Officer before acceptance.

Applications for enlistment should be made personally or by letter, stating full particulars, including age and trade to the Royal Air Force Reception Depot (see next page) nearest to the residence or place of Registration of the applicant.

Men are required for the following trades and employments:

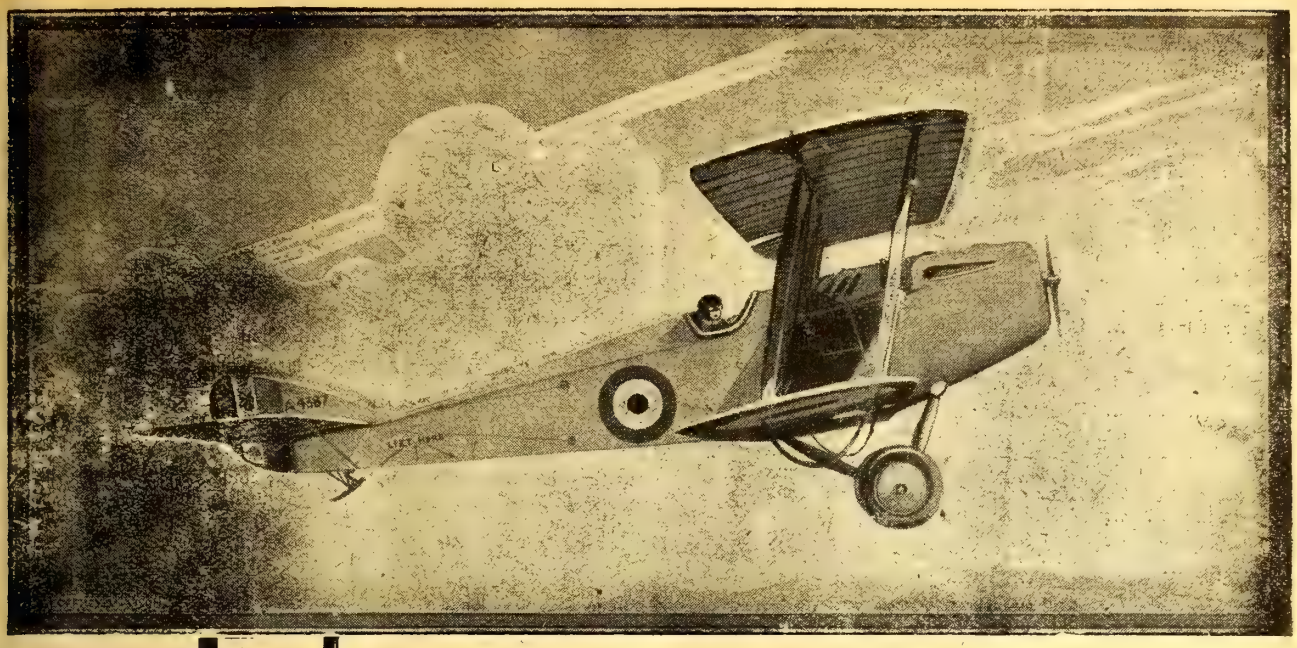
Technical.

Acetylene welder	Millwright
Armourer	Motor body builder
Blacksmith	Motor boat coxswain
Boat builder	Moulder
Camera repairer	Observer
Carpenter	Packer
Coppersmith	Painter
Draughtsman	Pattern-maker
Driver—	Photographer
Motor-boat	Pilot
Petrol	Propeller maker
Steam	Rigger (aeroplane)
Electrician	,, (airship)
Fitter—	Tinsmith and sheet metal
Aero engine	worker
General	Turner
Mechanical transport	Upholsterer
Jig and tool makers.	Vulcaniser
Hydrogen worker	Winch driver and fitter
Instrument repairer	Wireless mechanic
Kite balloon telephonist	Wireless operator
Magneto repairer	

These will, if suitable, be appointed in the Royal Air Force, according to ability, as follows:—

Rank.		Daily rate of pay. s.	d.
Air Mechanic, 3rd Class	Commencing rate of pay	2	0
Air Mechanic, 2nd Class	Commencing rate of pay	3	0
	After 3 years' service in the rank	3	6
Air Mechanic, 1st Class	Commencing rate of pay	4	0
	After 3 years' service in the rank	4	6
	After 6 years' service in the rank	5	0
Rising on Promotion to—			
Corporal Mechanic ...	Commencing rate of pay	5	0
	After 3 years' service in the rank	5	6
	After 6 years' service in the rank	6	0
Sergeant Mechanic ...	Commencing rate of pay	6	0
	After 3 years' service in the rank	6	6
	After 6 years' service in the rank	7	0
Chief Mechanic	Commencing rate of pay	7	0
	After 3 years' service in the rank	8	0
	After 6 years' service in the rank	9	0
Master Mechanic ...	(9s. + 2s. skill pay)	11	0
Chief Master Mechanic	(9s. + 3s. skill pay)	12	0

In addition, Free Kit, Food and Lodging on the various scales laid down from time to time for peace and war conditions.







MARTINSYDE

Aerodrome - and Auxiliary Works:
BROOKLANDS.

Head Office & Works:
WOKING, Surrey.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

NON-TECHNICAL.

Aerial gunner	Hospital orderly
Assistant armourer	Labourer
Batman	Packer's mate
Butcher	Painter's mate
Cook	Motor cyclist
Coppersmith's mate	Shoemaker
Disciplinarian	Tailor
Fabric worker	Telephone operator

These will, if suitable, be appointed in the Royal Air Force, according to ability, as follows:—

Rank.		Daily rate of pay. s.	d.
Private, 2nd Class ...	Commencing rate of pay	1	6
Private, 1st Class ...	Commencing rate of pay	1	8
	After 3 years' service as a private over 18 years of age	2	0
RISING ON PROMOTION TO—			
Corporal	Commencing rate of pay	2	4
	After 3 years' service in the rank	2	6
Sergeant	Commencing rate of pay	3	3
	After 3 years' service in the rank	3	5
	After 6 years' service in the rank	3	7
Flight-Sergeant	Commencing rate of pay	3	10
	After 3 years' service in the rank	4	1
	After 6 years' service in the rank	4	4
Sergeant-Major, Class II		6	9
Sergeant-Major, Class I		7	6

In addition, Free Kit, Food and Lodging, on the various scales laid down from time to time for peace and war conditions.

(For Separation and Dependants' Allowances and Pensions, see table at foot of page.)

All Learners will be entered in the "Non-Technical" Category and be re-mustered to the "Technical" Category when sufficiently qualified to be able to pass the prescribed examination.

CLERKS AND STOREMEN.

These will, if suitable, be appointed in the Royal Air Force, according to ability, as follows:—

Rank.	Daily rate of pay. s.	d.
Clerk, 3rd Class	1	8
Clerk, 2nd Class	2	0
Clerk, 1st Class	3	0
RISING ON PROMOTION TO—		
Corporal Clerk	4	0
Serjeant Clerk	4	9
Flight Clerk	5	6
Master Clerk (1st Class Warrant Officer)	6	9

In addition, Free Kit, Food and Lodging, on the various scales laid down from time to time for peace and war conditions.

(For Separation and Dependants' Allowances and Pensions, see table at foot of page.)

WAR PAY.

War Pay at 1d. a day for each year of service rendered since the commencement of the war will, subject to good conduct, be given to Privates 2nd Class, and Clerks 3rd Class only.

PEACE CONDITIONS.

A married establishment will probably be determined, but conditions cannot be stated in detail until the general policy after the war in this respect has been determined.

Promotions and the consequent increases of pay are rapid at the present time, subject only to skill and the behaviour of the men. For this reason Good Conduct Badges with pay will not be awarded to members of the Royal Air Force.

PENSIONS.

Have not yet been determined; it may, however, be taken for granted that the amounts payable will not be less than those awarded to men who have qualified for pensions in the Army.

BOYS.

The Royal Air Force will be open to receive boys from time to time for long service only, between the ages of 15 and 17 years.

PERIOD.

(a) 8 years with the Colours, including period served prior to attaining the age of 18 years and 4 years on the Reserve.

(b) Six months before the termination of 8 years' service with the Colours, they may, if recommended by their Commanding Officer and Air Ministry Authority is given, re-engage to complete their Colour Service to qualify for Pension.

RATE OF PAY.

1s. per diem with free kit, food, etc., and war pay at 1d. a day for each year of service rendered during the war, subject to good conduct. On attaining the age of 18 years Boys will be appointed 3rd Class Air Mechanics at 2s. per diem.

Boys will have an opportunity of learning a trade, which should be useful to them on their discharge.

All boys have to attend Divine Service at least once each week.

Boys are housed together under specially selected Disciplinary Non-Commissioned Officers.

The regular working hours for Boys do not exceed 48 hours per week. In the case of Boys under 17, they do not exceed 40 hours per week.

Systematic arrangements are made for the Boys' education, recreation and amusements.

MEDICAL CLASSIFICATION.

Grade 1 only.

Applications for enlistment should be made by letter, stating full particulars, including trade (if any). The following certificates will be required before completion of enlistment:—

1. Written consent of Parents or Guardians, duly witnessed.
2. Certificate of good moral character from clergyman.
3. Certificate of Birth.
4. Certificate of Schoolmaster of having passed Standard VI. or an educational equivalent thereto.

Applications should be made to the Royal Air Force Reception Depôt (see below) nearest to the residence or place of registration of the applicant.

No person is eligible for enlistment into the Royal Air Force unless he is a natural born British subject and the son of natural born British subjects.

ROYAL AIR FORCE RECEPTION DEPÔTS.

No. 1.—40, Upper Brook Street, Mayfair, London, W.1.
No. 2 (a).—8, Tyndall's Park Road, Bristol.
No. 2 (b).—12, Newport Road, Cardiff.
No. 3.—Carlton Chambers, Paradise Street, Birmingham.
No. 3 (a).—Midland Bank Warehouse, King Street, Nottingham.
No. 3 (b).—117, Mount Pleasant, Liverpool.
No. 4 (a).—6, Portland Crescent, Leeds.
No. 4 (b).—10, Sydenham Terrace, North Road, Newcastle-on-Tyne.
No. 5.—9, Somerset Place, Sauchiehall Street, Glasgow.

SEPARATION AND DEPENDANTS' ALLOWANCES.—WAR RATES.

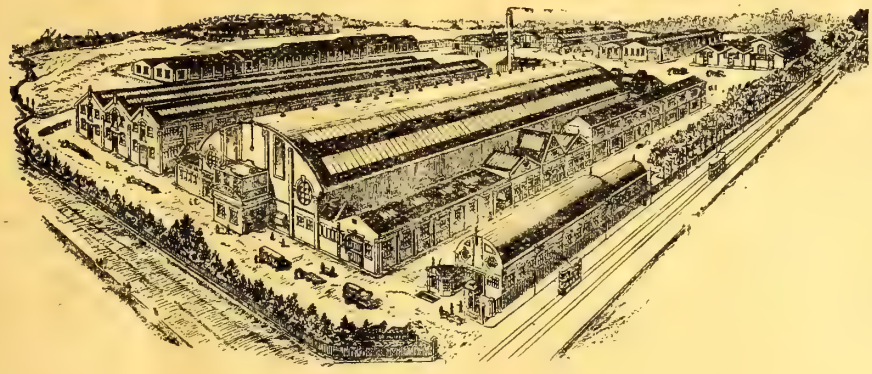
Married men joining and separated from their families will receive weekly allowances of which some typical cases are given below:

	Wife only. s.	d.	Wife and 1 child under 14. s.	d.	Wife and 2 children under 14. s.	d.	Wife and 3 children under 14. s.	d.	Wife and 4 children under 14. s.	d.	Remarks.
Private and Corporal	12	6	19	6	24	6	28	0	31	0	3s. each additional child
Serjeant (including Flight-Serjeant)	15	0	22	0	27	0	30	6	33	6	Ditto.
Warrant Officer, Class II	22	0	27	0	30	6	32	6	34	6	2s. for fifth child, 3s. each additional child.
Warrant Officer, Class I	23	0	28	0	31	6	33	6	35	6	2s. for each fifth and sixth child, 3s. each additional child.

NOTES.

1. Under certain conditions the above rates are increased by 3s. 6d. a week in the case of wives resident in the London area.
2. The rates for children over 14 are less.
3. The weekly rates for motherless children are:—
   Under 14 years of age.—For each child, if each is in the care of a separate guardian, 7s. Where two or more children of the same family are in the care of one guardian, 7s. for the first and 6s. for each other child.
   Over 14 years of age.—For each entitled child, 5s.
4. Other dependants.—In the case of dependants to whom the individual is bound by some natural tie, and who are found as a fact to have been wholly or partly dependant on him before enlistment, the amount which the individual used to pay to support the dependant is ascertained and paid as separation allowance, subject to certain limits. Fuller particulars can be obtained from any Post Office or Local War Pensions Committee.

The Olympia Works of the Blackburn Aeroplane and Motor Co., Ltd., Leeds.
Telephone . . . Roundhay 345.

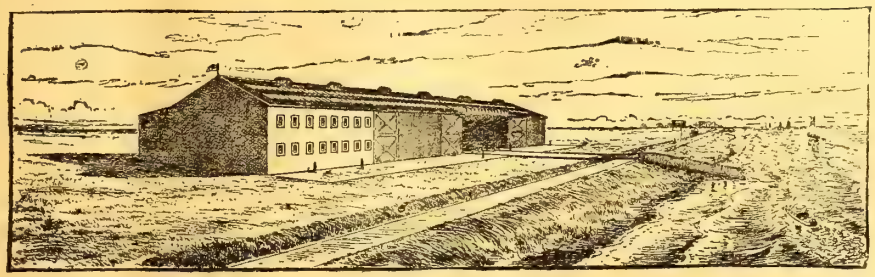


Pioneers in design and construction.

Blackburn AIRCRAFT

"Always at the Front!"

A View of the Company's Seaplane Sheds at Brough.
Telephone . . Brough 49.



The BLACKBURN AEROPLANE & MOTOR CO., Ltd., LEEDS
London Office: Donington House, Norfolk St., Strand, W.C.2.
Telephone . . . . Central 984.

Steele's Adv. Serv.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

R.F.C. LOSSES IN THE RETREAT.

The "Daily Telegraph" of April 4th says:—

"A word or two as to the position in the air, and the special effort Germany is reported to be making to get level with us in aerial fighting. Undoubtedly the enemy has concentrated all his available strength in this arm on the battle front, whilst we have been at some disadvantage as a result of having lost in the retirement a certain number of our advanced aerodromes

"As a consequence, the balance of loss has been more equal in the last three or four days than at the outset of the battle, when unquestionably we were very much on top. It is the opinion of a military expert that although we have definitely secured a superiority in the air so that we inflict more losses on the enemy than he inflicts on us we are a long way from having obtained what is called 'the command of the air.' That is to say, the enemy is still able to photograph our positions, etc., but it is the fact that we can always do more."

The loss of an aerodrome means the loss of all machines under repair, and of spare parts, stores, etc., so that it means putting a number of aviators out of action for the time being. This loss can be made up fairly quickly from home, at the present rate of output, but it should be impressed on all aircraft workers that present output is laid down to supply the present rate of expansion of the Air Force, and that an extra effort is needed to make good the losses.

The real danger is the amount of overwork which is cast on the remaining aviators who have not been demobilised by loss of matériel. This overwork is bound to cause an increased rate of casualties, especially among the fitter and more experienced men, who will naturally take on themselves the task of making good the shortage.

Thus one finds once more how absolutely interdependent are all branches of the Army, and how unwise it was to fiddle with alteration in the R.F.C. while their aerodromes were burning.—

C. G. G.

THE HUN BOMBING POLICY.

The "Daily Express" of April 4th says:—

"The Hamburg 'Nachrichten' is the journal which foreshadows the new menace from the clouds:—

"Our enemies have hitherto tried in vain to beat off the German air attacks, and our losses in machines have been extraordinarily insignificant. This is a success which in view of the strong British defence can only be called brilliant.

"We Germans may regard with pride and confidence the future of the war in the air. German technical skill will before long make short work of the English and French anti-aircraft weapons, and the day is not very distant when a simultaneous attack on London and Paris will be made of such formidable power than half those cities will be laid in ruins.

"On that day there will arise such a stupendous cry for peace among the English and French people that their present rulers will be compelled to obey the command of the popular clamour or risk their necks."

One is glad to see this testimony to the strength of the L.A.D.A. work. Success, however, is to be measured by results and not by insignificance of loss. Attacking forces which retire without pushing their attack home may well avoid losses, and the success in such case is with the defenders.

It is well to remember, however, that since the "moonless" raid some six weeks or so ago there has been only one night on which a raid from Flanders has been possible. Fog or adverse wind has prevailed every other night on the other side of the Channel. Consequently we again owe our chief defence to our good old English weather, which defeated the Spanish Armada.

At the same time, it is only fair to assume that during that period considerable strides have been made in strengthening the London defences; in fact, one may safely say that one is confident that such is the case. One might assume also that the Hun has been increasing his bombing fleet during the same period. But it seems probable that the increase is not so great in proportion because of the number of bombing machines which he has used up in operations in France, and because of the employment of aeroplane and engine factories in building fighting and reconnaissance machines for the battle areas.— C. G. G.

THE OTHER BIG PUSH.

In the midst of all our troubles it is comforting to learn that Aircraft Production is going ahead in a highly satisfactory manner. It may be impossible at short notice to reorganise so vast a concern as the Hotel Cecil and replace all the inefficient members of the staff by efficient people, and to abolish the old clogged system by one which works on forced-feed bearings. But there is no doubt that the new régime is pushing most work at a rapidly increasing rate.

Nowhere has Sir William Weir's system of selecting men of experience and ability to speed up production been more successful than in the department concerned with engines, and nowhere has his ability in choosing the right men for the various jobs been more remarkable. In two specific instances recently—one of which has been apparently the subject of ill-informed criticism—engineers of great experience, and of notable achievement, have been induced to leave work in which they have produced excellent results, in order to push along, or out, the mass of inefficient officialdom at the Air Ministry. Already one of them has proved that he will make good. In the other instance the official's record in producing record output from a solid old firm of the most conservative English type gives one complete confidence in his ability to increase still further the production of engines.

Active service people who continually feel anxious lest they and their subordinates should be let down by the people at home will be interested to learn that the Big Push on the Strand Front is progressing rather better than "according to programme."—

C. G. G.

A NEW APPOINTMENT.

The Secretary of State for the Royal Air Force has appointed Mr. W. A. Bland, Director of Departmental Finance, War Office, to be Assistant Financial Secretary in the Air Ministry.

BRAZIL AND THE WAR.

The following telegrams have been exchanged between the King and Dr. Wenceslau Braz, President of the Republic of Brazil:—

Brazilian President to the King:—

Brazil follows with the keenest emotion and firm confidence the courageous resistance of the English Army in the face of the present enemy offensive.

It is in this critical moment for the Allied arms that I think it opportune to reaffirm once more to your Majesty the solidarity of Brazil in the cause of the liberty of nations, and the early departure of our Fleet for European waters, thus sharing, within the measure of our powers, in the perils of war.

The King's reply:—

I most deeply appreciate the reaffirmation by your Excellency, at this great crisis, of Brazil's devotion to the cause of the Allies.

The British Navy looks forward with profound satisfaction to the co-operation of Brazilian warships, and Brazilian airmen are receiving an enthusiastic welcome from the Royal Air Force.

Your Excellency's message will be an encouragement to my brave troops engaged in the present violent battle, as well as to us all to persevere in securing, by complete victory, the liberty of nations.

FOR N.C.Os. AND MEN.

Ever-increasing aerial activity at the front, and the increase in the employment of N.C.Os. and men as observers and machine gunners, is resulting in heavier demands on the Royal Flying Corps Families' Relief Fund, which was founded by the Aerial League to give immediate temporary help to the dependants of N.C.Os. and men of the R.F.C. killed on active service.

Maj.-Gen. H. Arbuthnot, the chairman, writes to say that the fund is now getting very low, and he appeals for subscriptions.

These should be sent to the hon. treasurer of the fund, at the Aerial League's Offices, 46, Dover Street, Piccadilly, W.1.

NEW PHRASEOLOGY.

Aviation has been responsible for the introduction of many new and quaint words and phrases, many of which have passed into the language. "Blimp," "Hickboo," "Spikebozzle," and "Crosswaffle" are among them. All these are without etymology and are purely onomatopœic. Among newer efforts the nicknames "The Hotel Bolo," "Bolshevik Mansions," "Soviet Chambers," and "Trotsky Rents" as applied to certain Government offices have their merits as humorous efforts.

Quite the latest, however, is the coining of certain new verbs to express acts familiar to all who have to work among the intrigues of officials in general. One is therefore justified in publishing the first of the new series, because after a time such phrases crop up without anyone knowing who was originally responsible for them. Here are the three first:—

"To Balb," or "To Commit Balbery":—To short-circuit; to intrigue against; to build a wall round someone, so as to make him inaccessible to information or incapable of wielding power; to freeze out.

"To Josh":—To upset attempts made to balb.

"To Counterbalb":—To use the attempts or stones of the man who is building a wall round one for the purpose of building a wall round him.

The derivations of the above are obviously from Balbus who builed a wall and Joshua who blew one down with a blast.

The idea, but not the words, comes originally from the Americans, who talk of a man having a wall built round him when he no longer has any power, or no longer knows what is going on. The expression was found a bit too long for ordinary conversation. Hence the effort to produce efficiency by finding a suitable synonym.

GAS.

A man and girl were injured by a gas explosion in the Hotel Cecil on Friday, April 5th. It is stated that the gas escaped in the kitchen, which is in the basement.

It is understood that a number of people have suffered moral and intellectual damage, if not physical injury, from analogous causes in more exalted positions.

Telephone:—
OFFICE ... 912 REGENT.
WORKS ... 4762 KENSINGTON.
281-2-3 WEMBLEY.

Telegrams:—
"SOCIABLE, PHONE, LONDON."

HOOPER & CO. LTD.

AEROPLANE BUILDERS
TO H.M. AIR COUNCIL.

MOTOR-BODY BUILDERS

TO

BY ROYAL WARRANT.

BY ROYAL WARRANT.

BY ROYAL WARRANT.

HIS MAJESTY THE KING.
HER MAJESTY THE QUEEN.
HER MAJESTY QUEEN ALEXANDRA.
H.I.M. MARIE DOWAGER EMPRESS OF RUSSIA.
H.R.H. THE DUKE OF CONNAUGHT.

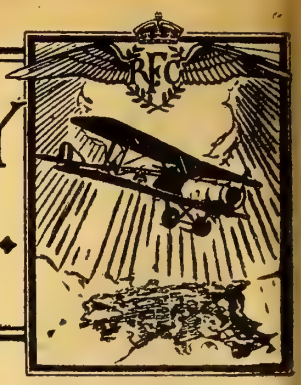
HOOPER & CO. are also Coachbuilders to

H.M. The King of Spain.
H.M. The King of Norway.
H.M. The Queen Mother of the Netherlands
H.R.H. The Princess Royal.
H.R.H. Princess Louise, Duchess of Argyll.
H.R.H. Princess Victoria.

54, St. James's Street,
PICCADILLY, LONDON, S.W.1.



NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, March 26th.

R.N.A.S.—Flt. Lt. to be Flt. Comdr.:—R. G. Mack, June 30th, 1917.

War Office, April 2nd.

REGULAR FORCES.—R.F.C.—Mil. Wing.—Gen. List: Temp. Serjt.-Maj. H. Jones, from R.F.C., to be temp. Sec. Lt. (March 31st).

* * *

The King has been pleased to approve of the award of the Victoria Cross to the following officer:—

Sec. Lt. (Temp. Capt.) James Byford McCudden, D.S.O., M.C., M.M., Gen. List and R.F.C.

For most conspicuous bravery, exceptional perseverance, keenness, and very high devotion to duty.

Capt. McCudden has at the present time accounted for 54 enemy aeroplanes. Of these 42 have been definitely destroyed, 19 of them on our side of the lines. Only 12 out of the 54 have been driven out of control.

On two occasions he has totally destroyed four two-seater enemy aeroplanes on the same day, and on the last occasion all four machines were destroyed in the space of 1 hour and 30 minutes.

While in his present squadron he has participated in 78 offensive patrols, and in nearly every case has been the leader. On at least 30 other occasions, whilst with the same squadron, he has crossed the lines alone, either in pursuit or in quest of enemy aeroplanes.

The following incidents are examples of the work he has done recently:—

On December 23rd, 1917, when leading his patrol, eight enemy aeroplanes were attacked between 2.30 p.m. and 3.50 p.m. Of these two were shot down by Captain McCudden in our lines. On the morning of the same day he left the ground at 10.50 and encountered four enemy aeroplanes; of these he shot two down.

On January 30th, 1918, he, single-handed, attacked five enemy scouts, as a result of which two were destroyed. On this occasion he only returned home when the enemy scouts had been driven far east; his Lewis gun ammunition was all finished and the belt of his Vickers gun had broken.

As a patrol leader he has at all times shown the utmost gallantry and skill, not only in the manner in which he has attacked and destroyed the enemy, but in the way he has during several aerial fights protected the newer members of his flight, thus keeping down their casualties to a minimum.

This officer is considered, by the record which he has made, by his fearlessness, and by the great service which he has rendered to his country, deserving of the very highest honour.

Air Ministry, April 2nd.

By an Order in Council the following officers are attached to the Royal Air Force:—

All officers holding permanent commissions in the Navy or Royal Marines or commissions other than temporary in the Royal Naval Reserve or Royal Naval Volunteer Reserve who on April 1st, 1918, belonged or were attached to the Royal Naval Air Service.

All officers holding permanent commissions in the Regular Forces or commissions in the Reserve of Officers, the Special Reserve (except Royal Flying Corps Special Reserve), Territorial Force or Territorial Force Reserve who belonged or were attached to the Royal Flying Corps.

All officers holding permanent commissions in the Indian forces who on April 1st were attached to the Royal Flying Corps.

The period for which those officers will be so attached will be the period of the war or four years, whichever may be the longer, unless the Air Council arrange with the Admiralty or Army Council for the return of an officer to the naval or military service before that time. The period, however, for which an officer who has been attached to the Royal Naval Air Service or to the Royal Flying Corps is attached to the Air Force shall in no case exceed such period as will complete the period for which he was attached to the Royal Naval Air Service or the Royal Flying Corps.

The following officers, warrant officers, petty officers, non-commissioned officers, and men are by the Order transferred to the Air Force:—

All other officers, all warrant officers, petty officers, non-commissioned officers and men of the naval or military forces (other than forces raised and provided by any part of his Majesty's Dominions outside the United Kingdom) who on April 1st belonged or were attached to the Royal Naval Air Service or the Royal Flying Corps.

All officers holding temporary commissions on the general list of the Indian forces and all officers of the Indian Army Reserve who on April 1st were attached to the Royal Flying Corps.

Any person transferred or attached to the Air Force by virtue of the Order may, within three months from the time when he receives notice of such transfer or attachment, give notice to his commanding officer that he does not desire to be transferred or attached, and the transfer or attachment will be annulled.

All officers serving with the Royal Naval Air Service and Royal Flying Corps on March 31st, 1918, or in connection with those services in certain Government departments, in other than the following capacities, are granted temporary commissions in the Royal Air Force, with effect from April 1st, 1918, in ranks which will appear in the Royal Air Force List.

In view of the special circumstances incident to the inception of the Royal Air Force these ranks must be regarded as subject to revision as circumstances may require until confirmed by the actual issue of the commission.

The exceptions are as follows:—

Certain officers of the Royal Navy whose services are only lent temporarily to the Royal Air Force.

Certain Accountant Officers, Royal Navy.

Officers under instruction, other than those holding commissions or appointments in the Royal Flying Corps.

Officers i/c Messing, other than those holding commissions or appointments in the Royal Flying Corps.

Officers serving with cadet units, other than those holding commissions or appointments in the Royal Flying Corps.

Liaison Officers, other than those holding commissions or appointments in the Royal Flying Corps.

Medical Officers and Chaplains.

Quartermasters, other than those holding commissions or appointments in the Royal Flying Corps.

* * *

The following appointments have been made at the Air Ministry:—

Dep. Master Gen. Pers.—Lt.-Col. (temp. Brig.-Gen.) G. Livingston, C.M.G., and to retain his temp. rank whilst so empld. (April 1st.)

Directors.—Maj. H. S. Ebben, O.B.E., and to be temp. Col. whilst so empld. (Feb. 18th); Lt.-Col. (temp. Col.) R. M. Groves, D.S.O., and to be temp. Brig-Gen. whilst so empld. (April 1st); Lt.-Col. (temp. Brig.-Gen.) J. G. Hearson, D.S.O., and to retain his temp. rank whilst so empld. (April 1st).

Deputy Directors.—And to be temp. Col. whilst so empld., if not already holding that rank:—Maj. (temp. Lt.-Col.) C. D. Breese, Maj. (temp. Lt.-Col.) C. L. Courtney, Maj (temp. Lt.-Col.) T. E. St. C. Daniell, M.C., Maj. (temp. Lt.-Col.) E. H. Davidson, Lt.-Col. (temp. Col.) J. D. Mackworth, Maj. (temp. Lt.-Col.) R. H. More, C.M.G. (graded for purposes of pay as S.O., 1st Cl.), Maj. (temp. Lt.-Col.) Hon. W. F. F. Sempill (Master of Sempill) (April 1st).

S.O., 1st Class.—And to be temp. Lt.-Col. whilst so empld., if not already holding that rank:—Maj. A. ap Ellis, Maj. (temp. Lt.-Col.) R. H. Austin-Sparks, Sec. Lt. W. C. Bersey; Lt.-Col. H. T. A. Bosanquet, Capt. R. B. Bourdillon, M.C., Lt.-Col. G. T. Brierley, D.S.O., Maj. (temp. Lt.-Col.) G. R. Bromet, D.S.O., Lt. (temp. Capt.) H. A. Browne, Maj. D. H. Cameron, Lt.-Col. A. D. Carden, Maj. (temp. Lt.-Col.) T. W. C. Carthew, D.S.O., Capt. E. G. H. Clarke, M.C., Maj. (temp. Lt.-Col.) B. S. Foster, Maj. M. Freeman, Capt. H. G. Gold, Maj. G. D. Hannay, Maj. (temp. Lt.-Col.) G. R. A. Holmes, O.B.E., Capt. (temp. Maj.) C. Jarrott, O.B.E., Lt.-Col. F. H. Kirby, V.C., Lt. (temp. Capt.) O. W. Latimer, Maj. Sir N. A. R. D. Leslie,

MANN EGERTON & Co.Ltd.

CONTRACTORS TO THE ADMIRALTY
AND H.M. WAR OFFICE.

Designers and Manufacturers of Proved Efficiency of all Types of AIRCRAFT

HEAD OFFICE AND WORKS

AIRCRAFT WORKS, NORWICH

SPECIAL DEPARTMENT
for the manufacture of
AIRCRAFT ACCESSORIES
(Strainers, Bolts and Nuts, etc., etc.)
177, CLEVELAND ST., LONDON, W.1.

MANN EGERTON & Co.Ltd.

LONDON NORWICH IPSWICH BURY ST. EDMUNDS.

Bt., Capt. H. E. A. Lindsay, Capt. T. Lyons, M.B.E., Maj. P. C. Maltby, D.S.O., Maj. H. A. Moore, M.C., Maj. J. T. C. Moore-Brabazon, M.C., Capt. (temp. Maj.) W. G. Perrin, Maj. (temp. Lt.-Col.) G. D. Pidgeon, Capt. (temp. Maj.) R. C. M. Pink, Lt.-Col. D. Powell, Lt. (temp. Capt.) R. W. Roylance, Capt. (temp. Maj.) W. J. Ryan, M.B.E., Maj. C. A. Shove, Capt. H. N. Walker, M.C., Lt.-Col. A. D. Warrington-Morris, Lt. (temp. Capt.) H. L. Webb, Lt. (temp. Capt.) B. J. Wolfe-Barry (April 1st).

S.O., 2nd Class.—And to be temp. Maj. while so empld., if not already holding that rank:—Capt. (temp. Maj. C. R. Abbott, Lt. (temp. Capt.) P. Adams, Capt. (temp. Maj.) M. H. P. Allen, Capt. (temp. Maj.) C. R. Andrews, Lt. (temp. Capt.) C. L. Archbold, Lt. (temp. Capt.) S. R. Axford, Lt. (temp. Capt.) W. E. Aylwin, M.B.E., Capt. L. P. Ball, Lt. (temp. Capt.) A. S. Barnfield, Lt. (Hon. Capt.) F. T. Bridger, Capt. J. W. Burt, Lt. (temp. Capt.) F. B. Burton, Capt. W. A. A. Chauncy, Lt. E. H. Cockburn, Maj. J. W. Cordingley, Capt. (temp. Maj.) G. W. Cranfield, Lt. (temp. Capt.) E. S. Cripps, Lt. (temp. Capt.) H. Cumming, Lt. (temp. Capt.) W. M. Cumming, Maj. J. G. Currie, Capt. (temp. Maj.) J. K. Curwen, Maj. J. F. Dyer, Capt. P. G. Edge, Maj. S. O. Everitt, Capt. H. Eves, Capt. W. H. Ewen, Capt. A. W. Farrer, Capt. E. W. Forbes, M.C., Lt. (temp. Capt.) C. J. Galpin, D.S.O., Maj. C. W. Gamble, Capt. F. J. Gray, Lt. (temp. Capt.) E. S. Halford, Maj. J. H. Hills, Maj. G. Hilton, D.C.M., Capt. (temp. Maj.) R. Holloway, Maj. E. F. Hutchinson, Capt. M. J. C. S. Johnstone, Capt. C. F. Krabbé, Capt. R. D. Law, Lt. (temp. Capt.) L. W. W. Lees, Capt. (temp. Maj.) E. G. Mackenzie, Lt. (temp. Capt.) D. McBirney, Lt. (temp. Capt.) H. P. Maybury, Lt. (temp. Capt.) H. J. de C. Moore, Capt. (temp. Maj.) C. J. Murfitt, Lt. (temp. Capt.) A. Murray, Capt. A. A. Nathan, Capt. (temp. Maj.) J. C. Neilson, Lt. P. S. J. Owen, Capt. (temp. Maj.) W. E. Plaister, Capt. (temp. Maj.) W. J. Polyblank, Capt. S. C. Raffles, Maj. A. C. Robinson, Capt. C. H. Rowe, Capt. J. C. Savage, Lt. (temp. Capt.) F. C. O. Shaw, Lt. (temp. Capt.) H. A. Smith, M.C., Lt. (temp. Capt.) G. E. Stagg, A.H.S./Maj. Steele Perkins, Capt. (temp. Maj.) Hon. E. A. Stonor, Capt. (temp. Maj.) T. F. G. Strubell, Capt. R. W. Thomas, Capt. (temp. Maj.) E. G. Toye, Capt. (temp. Maj.) G. S. Trewin, Capt. F. W. Trott, M.C., Capt. W. W. Tullis, Lt. (Hon. Capt.) E. F. Turner, Capt. A. B. Winch, Capt. R. H. Woods, Capt. J. E. L. Wrench, C.M.G. (April 1st).

S.O., 3rd Class.—And to be temp. Capt. while so empld., if not already holding that rank:—Lt. D. L. Abbott, Lt. H. Atkins, Capt. H. F. Atkinson-Clark, Lt. F. A. Barton, Lt. (temp. Capt.) T. G. Baxenden, Lt. P. M. Beachcroft, Capt. E. W. T. Beck, D.S.O., M.C., Lt. (temp. Capt.) W. E. G. Beauforte-Greenwood, Sec. Lt. (Hon. Lt.) W. A. Berry, Lt. A. O. Betts, Lt. D. Blairman, Capt. A. C. Bolton, Capt. R. C. Boustead, Capt. A. R. Boyle, Capt. C. G. Braithwaite, Capt. Hon. G. St. J. Brodrick, Capt. C. H. Bullock, Lt. A. L. Butcher, Capt. A. G. Clarke, Temp. Hon. Capt. B. S. Cohen, Lt. (temp. Capt.) J. W. Cole, Lt. R. A. W. Collet, Lt. F. A. Corbett, Lt. (Hon. Capt.) R. C. Cox, Lt. F. C. E. Dimmick, Lt. T. L. Edwards, Capt. G. Elliott-Lockhart, Lt. (temp. Capt.) G. C. Gold, Lt. J. C. Hanbury-Williams, Lt. (temp. Capt.) S. J. Hern, Lt. (temp. Capt.) W. Hodgson, Lt. (temp. Capt.) F. G. Hogarth, Sec. Lt. C. W. Hogg, Capt. (temp. Maj.) E. Hogg, Lt. F. J. Hooper, Lt. C. J. Hosken, Capt. L. S. B. Hull, Lt. (temp. Capt.) S. F. Ingram, Lt. (temp. Capt.) D. C. James, Lt. L. H. Jefferson, Sec. Lt. B. B. Johnson, Lt. C. G. Jones, Sec. Lt. H. Jones, Lt. (Hon. Capt.) W. J. King, Capt. W. A. Laurance, Capt. P. W. Logan, Lt. G. W. Longstaff, Sec. Lt. (Hon. Capt.) T. H. McArthur, Capt. A. J. Mann, Capt. (temp. Maj.) M. Marsden, Lt. (temp. Capt.) N. Martin, Capt. C. Mason, Lt. C. F. O. Master, Capt. A. McR. Moffat, Sec. Lt. P. E. Negretti, Lt. (temp. Capt.) N. D. Newall, Capt. (temp. Maj.) T. F. Norbury, Lt. (temp. Capt.) H. N. Nowell, Lt. T. A. Peddell, Capt. C. F. Rasmusen, Lt. (temp. Capt.) F. A. M. Rawes, Lt. N. F. W. Rockey, Lt. (temp. Capt.) J. Rylands, Lt. A. V. Sale, Lt. (temp. Capt.) C. A. Stevens, M.C., Lt. P. C. Simmons, Lt. (temp. Capt.) W. B. Sinclair, Lt. D. Smith, Capt. P. J. H. Sumner, Lt. J. E. B. Thornely, Lt. (Hon. Capt.) P. E. Tickler, Capt. (temp. Maj.) O. G. G. Villiers, D.S.O., Capt. E. G. Walker, Lt. (Hon. Capt.) D. C. Waylen, Capt. L. M Wells-Bladen, Lt. (Hon. Capt.) W. T. Williams, Lt. (Hon Capt.) C. S. Willmott, Capt. S. M. Wood, April 1st.

S.O., 4th Class, and to be temp. Lts. whilst so empld., if not already holding that rank:—Sec. Lt. G. F. Allison, Lt. B. D. Bellamy, Lt. (temp. Capt.) H. Cox, Sec. Lt. A. G. O. Ellis, Lt. (temp. Capt.) R. D. Hallam, Capt. J. F. Hedley, Lt. H. W. Hern, Sec. Lt. R. C. J. Hervey, Lt. C. J. S. Holden, Sec. Lt. H. B. Langton, Sec. Lt. (Hon. Lt.) E. Laurie, Lt. J. E. Pike, Lt. J. G. Spencer, Sec. Lt. H. J. Taplin, Sec. Lt. J. E. Tod, Sec. Lt. D. A. Tullis, April 1st

War Office, April 3rd.

REGULAR FORCES.—Staff.—Graded for purposes of pay as Staff Lt., 3rd Cl.—Temp. Sec. Lt. (on prob.) G. A. I. Bosanquet, R.F.C., Gen. List, March 4th.

The King has been pleased to approve of the award of the Military Medal to the following man:—

64937 2nd. Cl. A. Mech. H. Blair, R.F.C. (West Kilbride).

War Office, April 4th.

Memorandum.—His Majesty the King has been graciously pleased to approve of the appointment of Lt. Gen. Sir D. Henderson, K.C.B., D.S.O., as Col. of the High. L.I., March 3rd.

War Office, April 5th.

REGULAR FORCES.—Staff.—Special Appointments.—(Graded for purposes of pay as Staff Lts., 3rd Cl.).—Temp. Sec. Lt. H. G. L. Thompson, R.F.C., and to be transfd. to Gen. List, Jan. 25th.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.:—Temp. Sec. Lts., Gen. List, H. B. Bell, Feb 23rd; P. Carpenter, M.C., P. Wilson, Feb. 27th.

Flying Officer.—Lt. (temp. Capt.) F. McQuistan, R.F.A., T.F., reverts from a Flt. Comdr. and relinquishes his temp. rank, March 8th, sen. from June 26th, 1916.

Adj.—Capt. C. V. Mercer, E. Kent R., Spec. Res., from March 15th, to Dec. 18th, 1917.

Gen. List.—To be temp. Sec. Lts.:—1st Cl. Air Mech. S. F. Woods, from R.F.C., Dec. 7th, 1917; 1st Cl. Air Mech. E. G. Amatt from R.F.C., Dec. 15th, 1917; 1st Cl. Air Mech. C. Oxberry, from R.F.C., Dec. 20th, 1917; Flt. Serjt J. Hogan from R.F.C., Dec. 20th, 1917; Temp. Serjt.-Maj. C. A. Corbeaux, from R.F.C., March 11th.

Air Ministry, April 5th.

R.A.F.—The following appointments are made at the Air Ministry:—

S.O., 1st Cl.—The notification in the "Gazette" of April 2nd, 1918, concerning Lt.-Col. F. H. Kirby, V.C., is cancelled.

S.O., 2nd Cl.—Maj. Hon. M. Baring, Capt. (temp. Maj.) The Hon. Sir J. A. Simon, K.C.V.O., April 1st.

S.O., 3rd Cl.—Lt. (temp. Capt.) W. P. Groves, April 1st. The rank of Capt. C. F. O. Master is as now described, and not as in the "Gazette" of April 2nd.

Memoranda.—Col. C. L. Lambe, C.M.G., D.S.O., to be temp. Brig.-Gen. whilst commanding a Brig., April 1st.

J. de M. Hutchison, C.V.O., C.M.G. (Vice-Admiral, R.N.) to be temp. Col., with the hon. rank of Lt.-Gen., April 1st.

War Office, April 6th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing—Gen. List.—Temp. Sec. Lt. (temp Lt.) J. Durward, an Equip. Officer, 2nd Cl., to be temp. Capt. while specially empld., Jan. 22nd; 1st Cl. Air Mech. C. G. F. Carver, from R.F.C., to be temp. Sec. Lt., March 3rd.

* * *

With reference to the awards conferred as announced in the "London Gazette" dated Nov. 26th, 1917, the following are the statements of service for which the decorations were conferred:—

The Distinguished Service Order

Temp. Capt. Philip Fletcher Fullard, M.C., Gen. List and R.F.C.—As a patrol leader and scout pilot he is without equal. The moral effect of his presence in a patrol is most marked. He has now accounted for 14 machines destroyed and 18 driven down out of control in a little over four months.

A Bar to the Military Cross.

Temp. Capt. Harry George Ernest Luchford, M.C., Gen. List and R.F.C.—When engaged on a patrol, he and his observer encountered about 15 hostile aeroplanes, and shot one of them down in flames. Later, when engaged on a reconnaissance with three other machines, he encountered eight hostile aeroplanes, and shot one of them down. On another occasion he destroyed one of three hostile scouts which were attacking one of our machines, and also shot down a hostile two-seater.

Sec. Lt. (temp. Lt.) Victor Rodney Stokes White, S. Staffs. R. Spec. Res. and R.F.C.—While acting as observer on an offensive patrol he and his pilot shot down an enemy scout in flames. Later, while on a reconnaissance with three other machines, he and his pilot engaged eight enemy aeroplanes and shot down and destroyed one of them. On another occasion they destroyed one of three hostile scouts and also a hostile two-seater machine.

Lt. (Temp. Capt.) David Sidney Hall, Arg. and Suth'd Highrs. and R.F.C.

While leading back his formation of five machines from a bombing raid he was attacked on eight different occasions by numerous enemy scouts. He himself shot down one in flames and another out of control, while his observer shot down two in flames. He has at all times completed the task allotted to him and set a splendid example.

Capt. Frederic Hope Lawrence, Worc. R., Spec. Res. and R.F.C.

While leading a patrol of eight scouts, which were protecting a number of bombing machines, he attacked 10 enemy machines, driving one down in flames and preventing the bom

IT IS OF VITAL NATIONAL IMPORTANCE THAT WE

SAVE DOPE

WE HAVE INVENTED

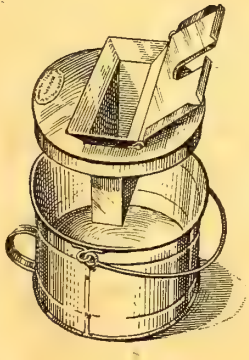
THE

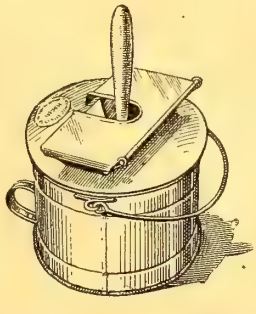
PATENT NON-EVAPORATING

DOPE CAN

APPROVED AND RECOMMENDED BY THE AIR MINISTRY.

SEND FOR SAMPLE.





ARTHUR HILL & CO.,
SHEET METAL WORKS,
SILCHESTER ROAD,
LONDON, W.10.

Phone: 1443 PARK.

ing machines being interfered with. On another occasion he attacked five enemy scouts, bringing one down in flames. He has brought down two other machines, and has at all times shown the greatest coolness and courage.

Temp. Lt. John Smith Michie, Gen. List and R.F.C.

On one occasion he attacked a hostile two-seater machine while it was leaving the ground and forced it to dive. He from a height of 150 ft. dropped his bombs on the machines on the aerodrome, destroying one. His machine was hit in the petrol tank and touched the ground, but he recovered and led his patrol back safely. On another occasion he attacked three hostile scouts, bringing one of them down. He has also carried out numerous actions on enemy troops and led many patrols with great success.

Sec. Lt. James Dennis Payne, Gen. List and R.F.C.

While on patrol with two other scouts he attacked a formation of seven enemy two-seaters, bringing down two himself while the two scouts brought down two more. Besides these, he has accounted for five other machines, and at all times shown the greatest gallantry.

War Office, April 8th.

REGULAR FORCES—Establishments.—R.F.C.—Mil. Wing. Staff Capt.—Temp. Lt. (temp. Capt.) P. C. Hoyland, Gen. List, from an Adjt., and to retain the rank of temp. Capt. while so empld. (March 6th).

Wing Comdr.—Maj. A. S. W. Dore, D.S.O., Worc. R., T.F., from a Sqdn. Comdr., and to be temp. Lt.-Col. while so empld. (March 12th).

Sqdn. Comdr.—Capt. C. H. Gardner, R.F.A., T.F., from a Flt. Comdr., and to be temp. Maj. while so empld. (March 11th).

Flt. Comdrs.—From Flying Officers :—Capt. W. J. Cairnes, Leins. R., Spec. Res. (Feb. 1st). And to be temp. Capts. while so empld. :—Temp. Sec. Lt. R. P. Fenn, Gen. List (Feb. 22nd); Sec. Lt. H. J. Whittingham, Spec. Res. (March 11th); Temp. L. G. C. Cuthbertson, Gen. List (March 12th); Temp. Sec. Lt. J. E. Wight, Gen. List (March 13th); Temp. Sec. Lt. R. R. Bentley, M.C., Gen. List (March 16th); Temp. Sec. Lt. G. McPherson, Gen. List; Temp. Sec. Lt. T. Colville-Jones, Gen. List (March 17th).

Asst. Instr in Gunnery.—Graded as an Equipment Officer 3rd Cl.—Sec. Lt. H. J. C. White (Oct. 11th, 1917).

Equipment Officers, 1st Cl.—Sec. Lt. (temp. Lt.) S. L. Amor, Spec. Res., from the 2nd Cl. and to be temp. Capt. while so empld. (March 6th).

Schools of Instrn.—Sch. of Technical Training.—Co. Comdr.—Graded as an Equipment Officer, 2nd Cl.—Temp. Lt. H. R. Gregg, E. Surr. R., to be temp. Capt. (without the pay or allowances of that rank,) while so empld., and to be transferred to R.F.C. Gen. List (Feb. 4th).

Gen List.—To be temp. Sec. Lts. :—Cpl. A. Morgan from R.F.C. (Dec. 31st, 1917); Serjt. J. Drew, from R.F.C. (Jan. 7th).

To be temp. Capts. (with pay and allowances as Lt.) while acting as Adjts.—Lt. J. H. Clive, Lond. R., T.F.; Lt. E. R. W. Close, Notts and Derby. R., T.F.; Sec. Lt. D. I. V. Gatty, R.G.A., Spec. Res. (Feb. 9th); Temp. Lt. F. R. Bush, attd. Rif. Bdg. (Feb. 19th).

Memorandum.—Sec. Lt. (temp. Capt.) L. Luker to be Lt. while serving with R.F.C. (Jan. 1st).

FROM THE COURT CIRCULAR.

Windsor Castle, April 6th.

The following had the honour of being received by the King this morning at Buckingham Palace, when his Majesty invested him with the Insignia of—

The Distinguished Service Order and Bar.

Capt. James McCudden, R.A.F.

* * *

The King then conferred decorations as follows :—

The Victoria Cross.

Sec. Lt. (temp. Capt.) James McCudden, R.A.F.

A Bar to the Military Cross.

Capt. Harold Balfour, K.R.R.C. and R.A.F.
Capt. James McCudden, R.A.F.

The Military Cross.

Capt. George Hackwill, R.A.F.
Capt. Geoffrey Hooper, R.E., attd. R.A.F.
Capt. Frederick Huxley, A.F.C.
Capt. William Shakespeare, R.A.F.
Lt. John Bell, R.F.A., attd. R.A.F.
Lt. Jack Broadway, Dorset Regt. and R.A.F.
Lt. Archibald Heaven, R.A.F.
Lt. Eric Steele, Man. Regt., attd. R.A.F.
Lt. Frederick Woodcock, R.G.A. and R.A.F.
Sec. Lt. Albert Frost, R.W. Surrey Regt., attd. R.A.F.
Sec. Lt. Alfred Wright, R.A.F.

OFFICIAL COMMUNIQUES.

MILITARY.

G.H.Q. Communiqués.

April 2nd, 9.28 p.m.—On the 1st instant several long-distance reconnaissances and photographic flights were carried out by aeroplanes. Good visibility enabled much work to be done in conjunction with the artillery, and many hostile batteries were engaged by our guns with observation from the air.

Our low-flying aeroplanes were again active. Over 17 tons of bombs were dropped, and thousands of rounds of ammunition were fired from the air at the enemy's infantry and other targets on the ground.

Hostile aircraft were also active on the southern portion of our front, some of their two-seater machines firing at our troops with machine-guns from a low height.

Ten hostile aeroplanes were brought down and six others were driven out of control. Another German machine was brought down in our lines by our infantry, and two hostile balloons were destroyed by our aeroplanes.

Eleven of our machines are missing.

After dark, our night-flying machines bombed the enemy's railway stations, billets, troops, and transport, dropping many tons of bombs on Cambrai railway station, on a station south-east of Douai, and on the railway line south of that town, as well as on other targets.

All our machines returned.

April 3rd, 9.37 p.m.—On the 2nd inst., although the weather was fine in the areas behind the front, a heavy bank of low clouds hung over the lines and made reconnaissance work difficult.

The enemy's movements on the battle front were watched, however, by low-flying machines, and observation was carried out for the artillery. Hostile troops and transport on the roads were again harassed with bombs and machine-gun fire, over 1,000 bombs being dropped during the day.

The enemy's aeroplanes were fairly active between Albert and Moreuil.

Thirteen German machines were brought down and eight driven down out of control. Three hostile balloons were also destroyed.

Seven of our machines are missing.

At night rain fell continuously until 3 a.m., after which hour 4½ tons of bombs were dropped on hostile billets and troops, our aeroplanes returning to their aerodromes just as dawn was breaking.

During the last fortnight of intense fighting in the air, the assistance rendered by the personnel of the American Air Service attached to the Royal Air Force has been invaluable.

April 4th, 8.55 p.m.—The weather on the 3rd inst. was again unfavourable for flying, but this did not prevent our aeroplanes from making several flights to reconnoitre the battle front and to attack ground targets with bombs and machine-gun fire.

One fight took place during a clear interval between two very large formations of our own and the enemy's machines. Otherwise hostile aircraft were not very active.

Nine German machines were brought down and three others driven down out of control. One hostile balloon was also destroyed.

Five of our aeroplanes are missing.

April 5th.—On the 4th inst., rain and mist greatly interfered with operations in the air. Our aeroplanes, none the less, reported the progress of the battle south of the Somme, and fired into the enemy's troops.

Of the German machines which appeared on this part of the battle front six were brought down by our aeroplanes and one was shot down by our anti-aircraft gunfire.

One of our machines is missing.

Two of our aeroplanes which were reported missing in the communiqués of the last two days have since returned to their squadrons.

About midday on the 5th inst. our aeroplanes dropped 22 heavy bombs on the railway station at Luxemburg. Many of the bombs were seen to burst on the railway and a very large fire was caused.

The anti-aircraft fire encountered was considerable, but all our machines returned.

April 6th, 7.45 p.m.—On the 5th inst., with the exception of a few flights on the battle front, no flying took place owing to the weather. One hostile aeroplane was shot down by our infantry.

April 7th, 9.27.—During the morning of the 6th inst., owing to bad weather, there was only slight aerial activity.

About noon our machines, which had been watching the enemy's movements on the battle front since dawn, reported a concentration of hostile troops south of the Somme. Large formations of our aeroplanes immediately went out in the rain and dropped over 500 bombs on the enemy's assembled infantry, in addition to firing some 50,000 rounds at them with their machine guns.

In air fighting 12 hostile machines were brought down and 1

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO
H.M. AIR FORCES.

Telegrams:
"AVIATION, BRISTOL."

Telephones:
3906 BRISTOL
(Private Branch Exchange)

others driven down out of control. Two German machines also were shot down by anti-aircraft fire.

Sixteen of our machines have not yet been located. Many of these have undoubtedly made forced landings behind our lines owing to the difficulty of finding their aerodromes in the heavy rain.

Throughout the present battle the Canadians in the Royal Air Force have done most valuable work.

April 8th, 8.55 p.m.—On the 7th inst. visibility was good, enabling useful work to be done by our aeroplanes in co-operation with the artillery, but clouds prevented long-distance reconnaissance and photographic flights.

Several good targets were engaged by our low-flying aeroplanes, whose pilots dropped 10 tons of bombs and fired a great many rounds of ammunition upon hostile troops and transport on the battle front.

South of the Somme hostile aircraft were active.

Six of the enemy's machines were brought down in air fighting and nine others driven down out of control. In addition, two other German machines were shot down by our anti-aircraft guns.

Four of our aeroplanes are missing.

During the night five and a half tons of bombs were dropped by us on Douai railway station and Bapaume.

THE CASUALTY LIST.

NAVAL.

Reported April 4th.

Killed.—Johnson, E. W., Aircraftman, 1st Cl., F.17153; Lovelock, H. G., D.S.M., Actg. Air Mech., 1st Gde., J.26402 (Po.); Prior, G. W., Aircraftman, 1st Cl., F.31588.

Reported April 5th.

Accidentally Killed.—Love, Flt. Sub-Lt. H. E., R.N.

Accidentally Drowned.—Mallard, Flt. Sub-Lt. N., R.N.

Died of Injuries.—Oakeshott, Flt. Sub-Lt. L. E., R.N.

Connop, Flt. Sub-Lt. H. A., R.N.

Missing.—Stocker, Flt. Sub Lt. E. C., R.N.

Carroll, Flt. Sub-Lt. J. G., R.N.

MILITARY.

Reported April 2nd.

Previously reported Missing, now reported Killed.—Barbour, Sec. Lt. H. D., R.F.C.

Bradley, Sec. Lt. G. P., R.F.C.

Caswell, Lt. E. D. S., Rif. Brig., attd. R.F.C.

Gloster, Lt. F. B., A.S.C., attd. R.F.C.

Marshall, Sec. Lt. L., R.F.C.

Powell, Sec. Lt. E. W., R.F.C.

Smith, Sec. Lt. W. S., W. Yorks R., attd. R.F.C

Stockhausen, Lt. I. L., Brit. W. Indies R., attd. R.F.C.

Wounded.—Greene, Sec. Lt. H., R.F.C.

Metford, Lt. C. K. S., R.F.A., attd. R.F.C.

Stringer, Sec. Lt. C. B., R.F.C.

Missing.—Evans, Capt. A. J., M.C., R.F.C.

Francis, Sec. Lt. W. G., R.F.C.

* * *

The following officers who were prisoners in Germany have arrived in Holland for internment:—

Crosbie, Capt. D. S. K., R.F.C.

Gladstone, Lt. C. A., Gen. List, attd. R.F.C.

Reported April 3rd.

Killed.—Bennett, Sec. Lt. J. B., R.F.C.

Lees, Sec. Lt. R. M., R.F.C.

Vaughan, Lt. F. S., R.W. Kent R., attd. R.F.C.

Wounded.—Bryson, Capt. R. E., R.F.C.

Kelly, Lt. A. P., R.F.C.

Matt, Sec. Lt. A. O., R.F.C.

Owles, Capt. E. T., M.C., R. Ir. Fus., attd. R.F.C.

Reeves, Sec. Lt. J. H., R.F.C.

Turnbull, Sec. Lt. R. B. E., R.F.C.

Valentine, Lt. W. H., R.F.C. (Sec. Lt., Lab. Corps).

Missing.—Banfield, Sec. Lt. C. B., R.F.C.

Isbell, Sec. Lt. A. T., R.F.C.

Kneller, Sec. Lt. F. K., R.F.C.

Canadian Forces.—Killed.—Sworder, Lt. M., Cav., attd. R.F.C.

Previously reported Missing, now reported by German Government Killed or Died of Wounds.—Ross, Lt. D. N., B.C.R., attd. R.F.C.

Accidentally Killed.—Carter, Lt. W. E., Cav., attd. R.F.C.

Missing.—Cantlon, Lt. F. H., M.C., Cent. Ont. R., attd. R.F.C.

MacLean, Capt. A. P., Cent. Ont. R., attd. R.F.C.

Wensley, Lt. J. H., Sask. R., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Law, Lt. J. R., A.S.C., attd. R.F.C.

April 4th.

The following officers, who were prisoners in Germany, have arrived in England after internment in Switzerland:—

Carmichael, Sec. Lt. W. R. C., High. L.I., attd. R.F.C.

Corbett, Capt. R., Yeo., attd. R.F.C.

Drury, Lt. D. D., R.F.C.

McIntosh, Lt. F. G., R.F.C.

O'Byrne, Lt. A. J., R.F.C.

Pinder, Sec. Lt. F. G., R.F.C.

Russell, Lt. H. B., R.F.C.

Toogood, Sec. Lt. J., R.F.C.

Reported April 5th.

Killed.—Shorter, Lt. W. J., Essex R., attd. R.F.C.

Died of Wounds.—Thompson, Sec. Lt., J. R. W., R.F.C.

Accidentally Killed.—Beckton, Lt. W., R. Welsh Fus., attd. R.F.C.

Morrell, Capt. H. F., Brit. W. Ind. R., attd. R.F.C.

Wounded.—Batchelor, Lt. E. C., R.F.A., attd. R.F.C.

Cornford, Sec. Lt. H., R.F.C.

Matthews, Lt. C. B., R. W. Surr. R., attd. R.F.C.

Tubbs, Lt. H. V. L., Lond. R., attd. R.F.C.

Missing.—Cassels, Sec. Lt. H. K., R.F.C.

Irvine, Sec. Lt. W. M., Northd. Fus., attd. R.F.C.

MacIlwaine, Capt. J. M., R. Ir. Rif., attd. R.F.C.

Reported April 6th.

Killed.—Worsley, Sec. Lt. R. E. M., R.F.C.

Wyatt-Smith, Sec. Lt. J. D., R.F.C.

Wounded.—Adams, Sec. Lt. D., R.F.C.

Bayley, Sec. Lt. L. J., S. Lan. R., attd. R.F.C.

Beanlands, Capt. B. P. G., M.C., Hamps R., attd. R.F.C.

Bevan, Sec. Lt. B. J., R.F.C.

Brown, Sec. Lt. A. C. G., R.F.C.

Curry, Sec. Lt. R. A., R.F.C.

Douglas, Sec. Lt. Lord C. C., K.O.S.B., attd. R.F.C.

Drysdale, Sec. Lt. N. M., R.F.C.

Gray, Lt. L. S., Lond. R., attd. R.F.C.

Hegan, Sec. Lt. R., R. War. R., attd. R.F.C.

Heigham-Plumptre, Sec. Lt. L. G., Bedf. R., attd. R.F.C.

Hore, Sec. Lt. C. A., M.C., N. Staff R., attd. R.F.C.

Johnstone, Sec. Lt. B. I., R.F.C.

Kernahan, Sec. Lt. J. E. A., R.F.C.

Orlebar, Capt. A. H., Bedf. R., attd. R.F.C.

Murray, Capt. G., R.F.C.

Parker, Lt. S. F., Middx. R., attd. R.F.C.

Peden, Sec. Lt. J. K. von I., R.F.A., attd. R.F.C.

Pope, Sec. Lt. A. D., R.F.C.

Pullen, Lt. F. J., Welsh R., attd. R.F.C.

Richardson, Sec. Lt. G., R.F.C.

Varley, Sec. Lt. E. R., R.F.C.

Warner, Sec. Lt. W. F., R.F.C.

Missing.—Birley, Sec. Lt. T. E. H., R.F.C.

Clarke, Sec. Lt. A. F. G., A.S.C., attd. R.F.C.

Clarke, Sec. Lt. C. H., R.F.C.

Cook, Sec. Lt. C. W., R.F.C.

Edelston, Sec. Lt. R. H., R.F.C.

Fluke, Lt. W. G., D.S.O., S. Staff. R., attd. R.F.C.

Hyatt, Sec. Lt. V., R.F.C.

Miles, Sec. Lt. A. A., R.F.C.

Naylor, Sec. Lt. F., L.N. Lan. R., attd. R.F.C.

Parker, Sec. Lt. G. H., R.F.C.

Poole, Sec. Lt. B. G., R.F.C.

Reynish, Sec. H. J. C., R.F.C.

Thackrah, Sec. Lt. N. H., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Ackers, Sec. Lt. C. H. S., K.R. Rif. C., attd. R.F.C.

Fielding Clarke, Sec. Lt. A., R.F.C.

Gilbert, Sec. Lt. F. C., R.F.C.

MacDonald, Sec. Lt. R., R.F.C.

Williams, Sec. Lt. S. G., M.C., Devon R., attd. R.F.C.

Windle, Sec. Lt. B. C. W., R.F.C.

Indian Forces

Previously reported Missing, now reported Died of Wounds as Prisoner in German Hands.—Steele, Lt. R. B., I.A.R.O., attd. R.F.C.

Australian Force.

Missing.—Nicholls, Sec. Lt. W. H., F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Couston, Sec. Lt. A., F.C.

Reported April 8th.

Previously reported Missing, believed Killed, now reported Killed.—Marvin, Sec. Lt. H. L., R.F.C.

Previously reported Missing, now reported Killed.—Angus, Lt. R. E., Yeo., attd. R.F.C.

Bevan, Sec. Lt. W., R.F.C.

Clark, Sec. Lt. E. V., R.F.C.

Ferguson, Sec. Lt. C. E., R.F.C.

Glendinning, Sec. Lt. J. G., Mon. R., attd. R.F.C.

Howells, Sec. Lt. G. J., R.F.C.

Hutchinson, Lt. A., L'pool R., attd. R.F.C.

Kann, Lt. E. H., R.F.C.

Madeley, Sec. Lt. C. N., R.F.C.

Noon, Sec. Lt. G., Sher. For., attd. R.F.C.

Paton, Lt. D. M., R.F.C.

Pitman, Capt. A. F. E., Sea. Highrs., attd. R.F.C.

Rhys-Davids, Lt. A. P. F., D.S.O., M.C., R.F.C.

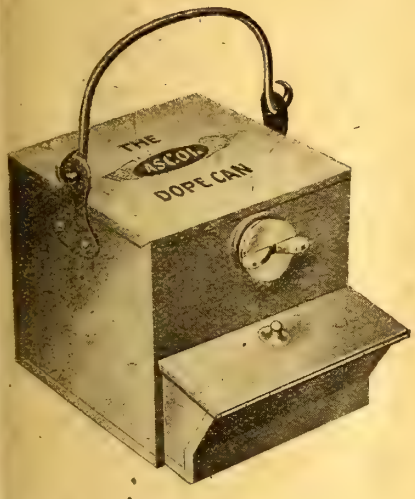
Mann, Sec. Lt. W. G., R.F.C.

Rosenthal, Sec. Lt. A., R.F.C.

(*Continued on page* 1369.)

The "Ascol" Dope Can

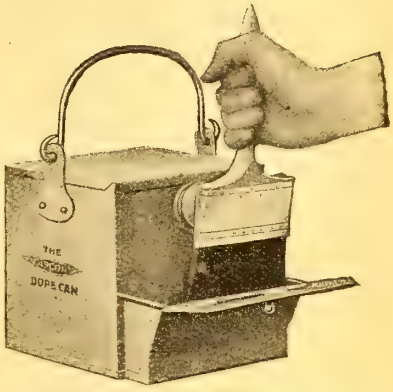
(REGISTERED DESIGN 663,563).



When not in use.

HAS been specially constructed with a view to economising Dope. The brush can be strained before being taken out of the can. The can is easily filled and is constructed to hold the right amount of dope for a morning's work. It is made for hard and rough wear, and will be found exceedingly handy, durable, and invaluable for doping purposes. Can be supplied with manufacturers' own name on can without extra charge.

120/- per dozen.
(Samples at same rate.)



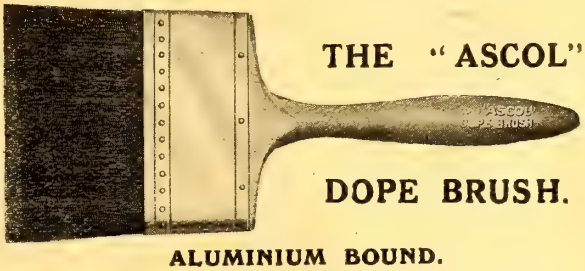
Showing Brush being strained ready for use.



Ready for use.

"ASCOL" LEAFLETS.

Aircraft Manufacturers are invited to write for the Folder of "Ascol" Leaflets dealing with "Ascol" Specialities. They consist of "Ascol" Micrometers, Stools, Engine Brushes. Dope Brushes, Dope Cans, File Cleaners, etc,



THE "ASCOL" DOPE BRUSH.

ALUMINIUM BOUND.

Size - 2in., **2/6**; 4in., 5/-
(Samples supplied at List Prices.)

Specially designed after a careful study of the requirements of Aircraft Manufacturers. They are made of the finest bristles, which are set firmly in the handle.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

Head Offices, Showrooms, and Stores:

ASCOL HOUSE, 125 LONG ACRE, LONDON W.C.2.

Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

G. H. MANSFIELD,
Managing Director.

Works:
Little James St.,
London :: W.C.1.

Telephone
Gerrard ... ... 276.
Private Branch Exchange.

Telegrams
"Upcast, Rand,"
London.

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

Offices & Works
HENDON, N.W.9.


CELLON
-NON-POISONOUS-
DOPE
CELLON, LTD.,
Broad Street House, E.C. 2.
Telephones: London Wall 5359, 3622.
Telegrams: "AJAWB London."
S.B.A.C.
CELLON WORKS
GEOFFREY WATSON 1917

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co. Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge Motor Factory
WEYBRIDGE

S.B.A.C. The Society of British Aircraft Constructors

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—II.

BY C. SYLVESTER.

Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Thermodynamics.

It is the aim of every designer of prime movers to produce as perfect a machine as is possible, especially in times like the present, when competition is so keen. The two outstanding features which will always recommend a prime mover in the market are:—

1. Low cost of erection and maintenance.
2. Low fuel consumption.

From these features it will be seen that the chief item to be taken into consideration by the designer is the efficient and economical conversion of heat into work.

Heat.

Before it is possible to carry out even the simplest designs it is necessary to have a good knowledge of heat, the methods used to convert it into work, and the technical terms which are essential to the correct understanding of the subject.

In these articles, although we are dealing with the design of internal combustion engines only, it may be said that the same rules follow for internal and external combustion engines. The only difference in the production of the heat is that with internal combustion engines the fuel is burnt inside the engine—to be correct, in the cylinder. And with external combustion engines the fuel is burnt outside the engine.

A steam turbine is a good example of the external combustion engine. Here the fuel is burnt under a boiler, and heat in the shape of steam is conveyed to the turbine by means of pipes.

Heat is sometimes termed temperature. That is, when referring to the amount of heat in a body it is said that the temperature is more hot or cold, as the case may be. Heat may be imparted from a hot to a cold body, but it does not follow that the amount of heat taken from the hot body is transferred to the cold body. Only a percentage of the total quantity will be transferred.

For instance, we will consider for a moment a steel kettle of water on a fire. In this case heat will be transferred from the fire to the metal of the kettle, and again from the metal to the water. Owing to the resistance of the steel and water to heat, a certain amount of heat units will be lost. If a copper kettle were used, owing to the greater heat conductivity of copper over steel a larger amount of heat would be transferred.

The ratio of the heat used and the heat transferred may be said to be the efficiency of the transfer. That is, we will presume that 50 units of heat are used, and 30 units are actually transferred, then the efficiency will be 30 divided by 50, this equals 60 per cent.

The British Thermal Unit.

We now have to consider the unit of heat known as "the British Thermal Unit." This is defined as the quantity of heat necessary to raise the temperature of one pound of water one degree Fahrenheit, the temperature of the water being at the time of maximum density—that is, 39.4 degrees Fahrenheit.

Here it will be seen that we have a comparison between heat and energy. On one hand we have a certain amount of heat, on the other we have the amount of work done by this quantity of heat. The mechanical equivalent to a "B.T.U." is 778lbs. raised one foot, and its electrical equivalent—one kilowatt-hour—is 3,411 B.T.Us.

In the above we are dealing with water, and one desires to point out that the same rules do not apply when dealing with, say, iron or steel. The amount of heat necessary to raise the temperature of the same weight of iron one degree Fahr. would be considerably less than one B.T.U. Here, again, we have "specific heat," which may be described as the amount of heat, in thermal units, necessary to raise any unit mass one degree Fahr.

Although the economical production and transfer of heat is the outstanding aim of the designer, it may be also said that it is the limiting feature of design, since the metals used in actual construction must be of such material strength as to be able to resist, as much as possible, the action of, not only the quantity of heat, but the expansion and contraction that naturally follows the heating and cooling of metals.

It is not possible to produce an alloy or metal that will not expand or contract under the influence of heat, but as some metals expand more or less than others, those materials which expand least should be used in the construction of parts that are subjected to increase of temperatures, providing, of course, that the mechanical strength, the nature of the metal, and the heat-resisting properties are satisfactory.

Comparative Temperatures.

The subject of heat is as interesting as it is extensive, but for our purpose it is not necessary to have more than a good general knowledge of the subject. To further this end and to simplify the subject it is well to study the diagram in Fig. 1, which is almost self-explanatory. This, with a few brief comments on high and low temperatures, will give the student a clear understanding of the relative terms.

The base line of Fig. 1 is "absolute zero," that is, —273 degrees Centigrade. Thermodynamically speaking, at this temperature everything is dead, or at least it is without motion or energy. This condition has never really been reached, but it has been very nearly approached. In this state, barely 1.6 degrees from absolute zero, hydrogen is frozen and helium gas becomes liquid.

At —200 degrees air is liquid, but certain forms of bacteria have been known to survive this temperature. At a temperature of —40 degrees other forms of life exist. In the Arctic regions, where the temperature never rises above —5 degrees, but is often as low as —40 degrees, bird life exists

At 37 degrees Centigrade, the temperature of warm-blooded animals, life thrives on this planet, but if we go a little higher, say to 63 degrees, the boiling point of water, then all life ceases to exist.

At 525 degrees all matter commences to assume a visible glow, and at 800 degrees all magnetism, and, therefore, the source of electrical energy, ceases to exist.

When a temperature of 1,000 degrees is reached, thirty of about fifty known metals are molten, while at 2,000 degrees nearly all substances known to us are gaseous or molten. At 2,700 degrees all matter in the air is vaporised or is liquid.

If we ascend another 300 degrees we approach the temperature at which tungsten melts, and at about 3,700 degrees carbon, which has no true melting point, commences to evaporate.

Above these temperatures there are only two of the fundamental properties of matter that remain constant and unmodified—inertia and weight. The kinetic energy of a unit mass of matter moving with a given velocity remains the same as at ordinary temperatures. That is, the earth will attract the mass with the same force, no matter what the temperature may be.

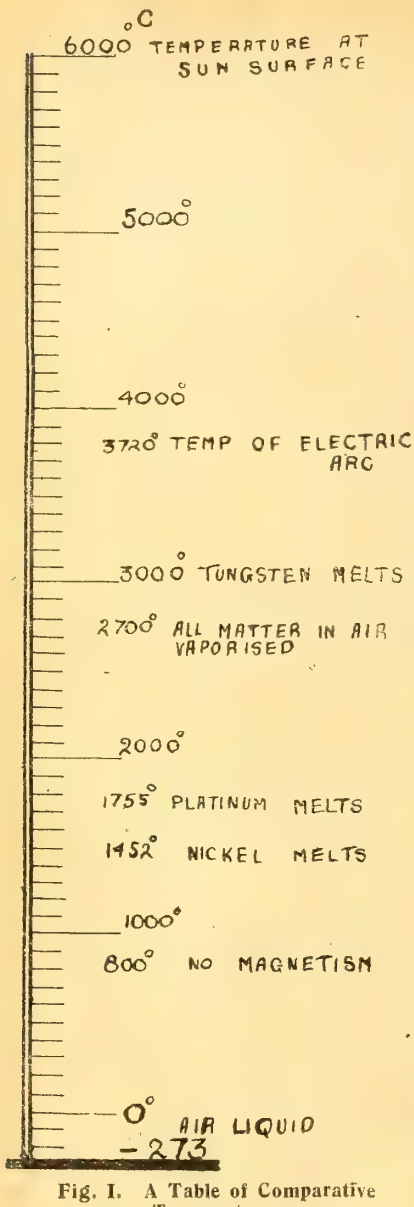


Fig. I. A Table of Comparative Temperatures.

The Part Played by the Heat.

From the above it will be seen that the effect of heat on metals and gas plays a very important part in the design and construction of internal combustion engines. As far as the metals are concerned, mechanical strength, together with the expansion and contraction and the suitability of these metals for their respective functions, have to be carefully considered.

With gases it is essential that the laws governing their expansion should be clearly understood, as the volume that a gas occupies depends upon the temperature and the pressure to which it may be subjected. These laws are explained by Charles and Boyle as follows:—

Charles' Law.

All gases expand equally when heated at constant pressure, and for every degree Centigrade, the expansion is 1/273 part of its volume at 0 degrees Centigrade.

Boyle's Law.

Boyle's law states, "The product of the pressure into the volume of a given mass of perfect gas remains constant, so long as the temperature of the gas is unchanged."

Expansion of Gas.

The expansion curve, Fig. 2, clearly illustrates the relation between the volume and the pressure of a certain mass of gas maintained at a constant temperature. In this diagram at the point A, P and V represent the respective pressure and volume of a mass of gas.

If the pressure falls to P_1, then the volume is increased to V_1.

The internal energy of a gas depends upon its temperature, and it may be said that a gas may be heated in two ways:—

1. At constant pressure, the volume varying.
2. At constant volume, the pressure varying.

Here, again, we have specific heat at constant pressure, and also specific heat at constant volume. The former may be said to be the amount of heat necessary to raise the temperature of one pound of gas one degree, "the pressure remaining constant," and the latter is the amount of heat necessary to raise the temperature of one pound of gas one degree, "the volume remaining constant."



Fig. II.

A Simple Example.

When gas is heated at a constant pressure the temperature increases, but work has to be done before the volume will increase. This is quite clear if we glance at Fig. 3 which represents a cylinder with one end open. In this diagram Pn. is a piston, the original position of which is indicated by the dotted lines. We will now presume that the space P encloses a given volume of gas.

If this gas is heated with the piston firmly held in its original position, no external work will be done. The heat given to the gas, however, raises the temperature and pressure thus increasing the internal energy. Now if Pn. be released it will move towards the end of the cylinder as shown, the actual distance depending upon the pressure of the gas.

In this diagram the cylinder is shown open at one end to avoid air compression, and it must be presumed that the piston is frictionless.

The specific heat of a gas at constant pressure is greater than the specific heat at constant volume, therefore to maintain a constant pressure the volume must increase.

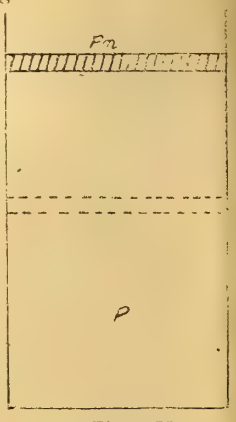


Fig. III.

If it were possible for a gas to expand without doing external work, or without taking in or giving out heat, then there would be no change in its temperature.

In Fig. 3 the actual power in foot pounds may be expressed as P x V, that is, where P is the pressure in pounds per square foot, and V is the volume in cubic feet.

In these articles it is not necessary to go into intricate mathematical details concerning "*Isothermal*" and "*Adiabatic*" expansion. Just sufficient details to give the student a clear understanding of these terms will meet the case.

Isothermal expansion may be best defined as expansion where there is no change of temperature. That is, the amount of work done will be equal to the heat supplied.

When referring to *Adiabatic* expansion it may be said that the internal energy of the gas is converted into work, and as the energy is expended the temperature is lowered.

From this it will be seen that, as isothermal expansion occurs at a constant temperature, and adiabatic expansion is in proportion to the internal heat units, if curves are taken of the respective expansions, the adiabatic curve will fall below that of the isothermal, that is, for a mass of gas of a given volume and pressure.

(To be continued.)

CO-OPERATIVE RESEARCH.

Coventry, March 24th, 1918.

Sir,—I am very interested in the series of articles which have been running in The Aeroplane on Co-operative Research, and I quite agree with every word that has been written. It is high time that a Research Association were formed of men who thoroughly understand their business. There could only be one result, and that is efficiency in every branch of aero work.

The high status of the general engineering trade has only been reached through research carried out at a time when it was necessary. As an example I suggest the steam engine. Time has proved that the old triple expansion sets manufactured by the immortal Bellis and Morcom are worse than useless when compared with the present-day turbine. Yet, the steam engine was very welcome as a prime mover, and it was only research in the right direction that enabled us to throw it on one side and adopt something better.

Thus it is with aero work. I really believe that the present design of aero engine and plane can be considerably improved.

C.S.

PRESENTATION AEROPLANES.

The Manchester Chamber of Commerce has given an aeroplane to the Empire of India. The machine, which is named "Manchester," was presented on March 2nd at a gathering in the city which included Lord Desborough, president of the Imperial Fleet Committee. He said that the Committee owed its inception to the fact that a number of public men saw the vital importance of flying some time before it seized the imagination of the people and the Government. They wanted to present to the great self-governing Dominions and India the nucleus of an air fleet, so that they might be prepared for contingencies. [It occurs to one that the nucleus will be very small by the time the "Manchester" reaches India after service at the front for three years or the "duration of the war."—Ed.]

A telegram was read from the Viceroy of India stating that in India scope for air activity and usefulness had greatly developed. Our aviators' operations had shown how aircraft could be used in frontier warfare.

Where absolute reliability is essential

B.T.H. Magnetos
are specified.

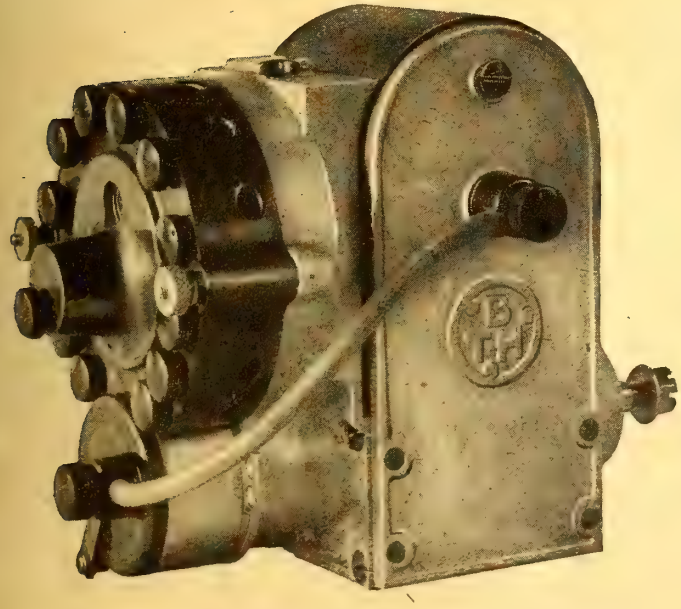
OUR extensive and varied experience in the manufacture of high quality electrical apparatus has been drawn upon in the design and manufacture of

B.T.H. Magnetos

with the result that they are to-day the equal of any magneto in the world, and their absolute reliability has been proved in service under the most difficult conditions.

Although our present output is requisitioned for war purposes, supplies will be available after the war for those desiring the highest quality magnetos of British manufacture, which will give economical and thoroughly satisfactory service.

Member of the British Ignition Apparatus Association.



B.T.H. Magneto for 12-Cylinder Engine.

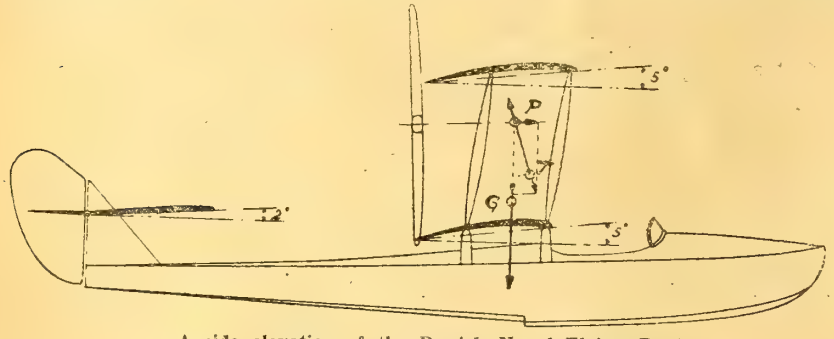
THE
BRITISH THOMSON-HOUSTON Co., Ltd.
Electrical Engineers and Manufacturers,
LOWER FORD STREET, COVENTRY
ENGLAND.

FLYING IN DENMARK.

The Aeroplane's Danish Correspondent writes:—

Earnest work with flying-boats in Denmark has been known for several years, but being carried out by the Royal Dock Yards, and the good results standing to the credit of its sub-director, Mr. H. C. Christensen, particulars have not been available.

Some illustrated records have now been published from which it is permissible to state that the two original Donnet-Levique flying boats proved rather unsatisfactory, the planes changing in shape and angle of incidence, owing to unsuccessful design and inferior materials. Wherefore one of them was rebuilt and accompanied the submarines over a respectable distance in the spring of 1914.



A side elevation of the Danish Naval Flying Boat.

During the summer a new flying boat was built, where only the boat shape and the motor installation were maintained. The area of surface was increased from 21 square metres to 30 square metres, the wing curve improved and the whole construction lightened by the employment of hollow spars and supporting ribs, as well as the resistance being reduced to furthest extent. This resulted in an increase of the useful load, comprising pilot, passengers and fuel for 1½ hours, to the same number of passengers and 3½ hours' fuel. The gliding capacity was improved, too, and the speed was equal to that of the smaller type.

This flying boat "Maagen (Seagull) II." undertook daily patrol flights in all weather conditions during autumn, 1914, and put up both Danish distance and altitude records. In spite of holidays and periodical engine overhauls the first two flying boats built at the Royal Dock Yards were in service on 160 days during the latter nine months of 1914.

From the experience gained the Dock Yards developed a new type, striving foremost at a quicker rise from the water, a higher stability and an increase of speed to be obtained from a special hull-shape and from an improved plane design and general mounting. The first tests with "Maagen III.," illustrated herewith, in December, 1914, resulted in following performances, with the same horse-power—80 Gnome—compared with the before mentioned flying-boat.

The speed was increased by 12 kilometres per hour, the climbing capacity to 1,000 metres was reduced in time from 16 minutes to 8¾ minutes, the rise taking place after a start of 15 metres' length against 40-50 metres formerly. These results were largely owed to the figures suggested by the scientific research of Eiffel and the British National Physical Laboratory.

Later developments in models and horse-power have been along the lines followed too in the belligerent countries, but here it is not yet permittable to publish particulars.

AIRSHIPS AT A DISCOUNT.

From the "Times" of March 13th:—

The last annual report of the German Airship Company, of Frankfurt-on-Main, seems to show that the company has almost entirely abandoned the construction of airships.

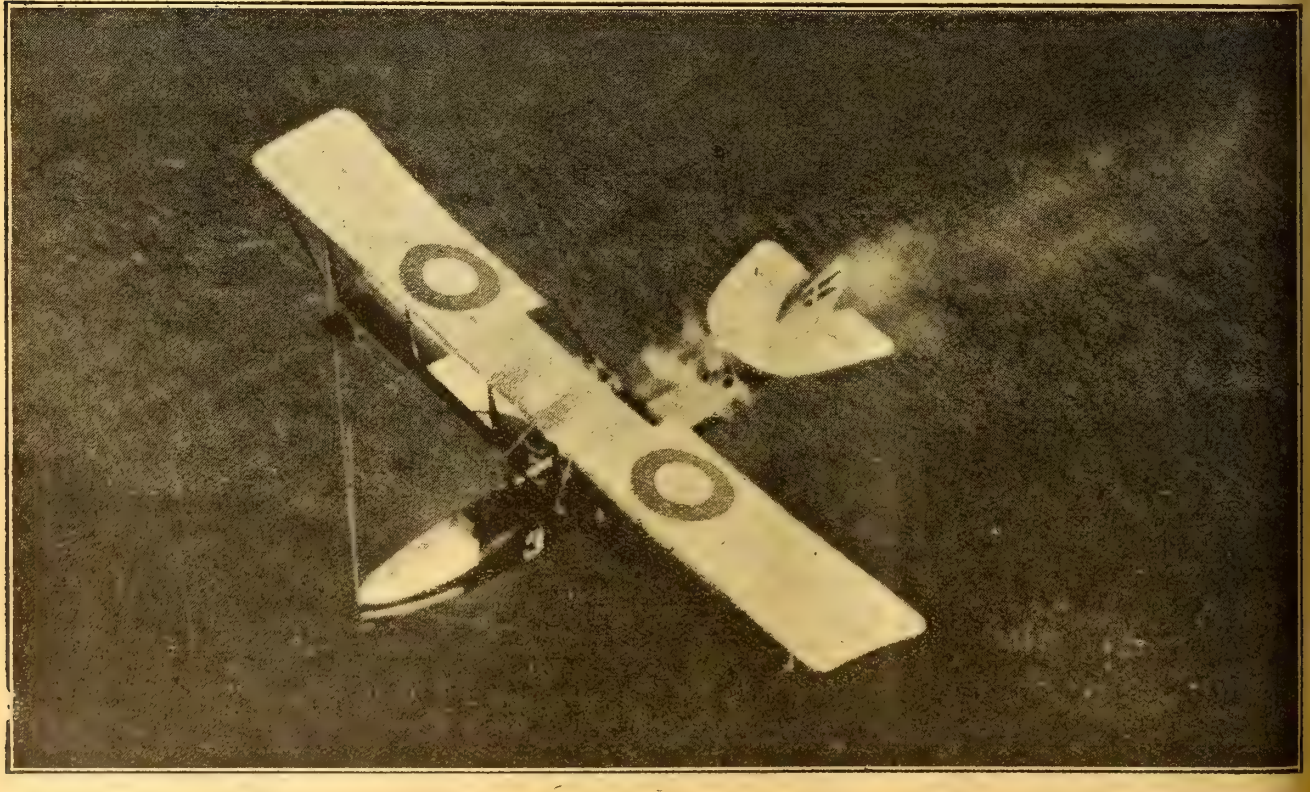
According to the "Frankfurter Zeitung" the year's profits on construction have fallen from £6,795 to £2,794, "because the company had to abandon for the most part its former branch of construction." The airship sheds belonging to the company are valued at only £7,800, as compared with £16,350 a year ago. It is stated that "since the autumn of 1917 the company has devoted itself to a new field of work, which promises reasonable profits."

THE AERONAUTICAL SOCIETY OF GREAT BRITAIN.

Mr. W. H. Barling, B.Sc., A.F.Ae.S., will read a paper on "Timber, its Identification and Mechanical Properties" before the Aeronautical Society on Thursday, April 11th, at the Royal Society of Arts, Adelphi, at 8 p.m.

THE LINEN INDUSTRY.

The already numerous war anxieties of Ulster linen manufacturers have been added to by the extraordinary delay of the War Trade Department in London in issuing export licences, and one of the largest firms announces that owing to the delay and consequent congestion in the warehouses they will be closed until sufficient licences are obtained to justify a resumption of work.



A Danish Naval Flying Boat, photographed from another aeroplane.

Britain Supreme in the Air!

ROLLS-ROYCE AERO ENGINES

like Rolls-Royce Cars are the best in the World. By their wonderful achievements they are making Britain and her Allies Supreme in the Air.

Describing the historic flight from London to Constantinople in thirty hours the "Autocar" says:

"The fact must be recorded that the Engine never failed for a moment throughout the entire journey to Constantinople. Great therefore as was the reputation of the Rolls-Royce Engine before the flight, the epic achievement described added new laurels to its wonderful career."

ROLLS-ROYCE

Contractors to H.M. Government. LTD.

14 AND 15, CONDUIT STREET, LONDON, W.C. 1.

Telegrams: 'Rollhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*

AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

Trade Commissioners.

Can their Services be Turned to Account by the Aircraft Industry?

Some few years ago the British Government made the surprising discovery that the interests of our industries in the Empire Overseas were worth safeguarding.

Until that time the foreign manufacturer desirous of cultivating our markets in his own interest could always depend upon the active help of the representatives of his Government on the spot. Not so the Britisher, who was obliged to shift for himself and to do his business with anyone left available after the astute foreigner had nobbled nearly all the most capable local men.

To remedy this state of affairs, the Government, in a fit of unwonted generosity, provided sufficient money to pay the salaries—strictly moderate—of no less than four Trade Commissioners who were supposed, between them, to cover and to be thoroughly familiar with the business community and methods of an Empire which, despite the efforts of our politicians, is still somewhat larger in extent than Upper Tooting.

The experiment was successful. The Trade Commissioners found more than enough work to do and realised that, were their numbers multiplied, there might be a chance of getting some of it done.

Consequently, after a few years of appreciative observation of its handiwork, and stimulated by the war to fresh exertions, the Government decided to increase the service of Trade Commissioners very materially—I believe the total is presently to rise to as many as twenty, and on that assumption I leave my readers to estimate how many square miles must come within the jurisdiction of each man.

The result of this calculation will, I think, serve to corroborate my impression that the Trade Commissioner who goes for broad principles and indulges in a wide outlook has a better chance of cutting some ice than the man who specialises in details.

This, I gather, is the collective view of the Board—largely consisting of real business men—responsible for selecting candidates. Thus it seems probable that the enlarged service will consist mainly of men possessing breadth of view and of education, and therefore competent to exert influence in the less hide-bound Government circles of the Oversea Dominions.

From the point of view of the Aircraft Industry, this is all to the good. The Industry does not seek to peddle its wares. It does not need inquiries to be made, on its behalf, into the status and honesty of small oversea traders. Aircraft cannot be sold like soap or gramophones.

Now I suggest that the first thing we have to do is to become quite clear as to what we do want.

Is there any information, that a Trade Commissioner might gather, which would be of real use to us?

If there is, then we ought to tell him so, and to tell him what we want him to find out for us, and why. Give him a chance of showing intelligence, and give him special opportunities of directing that intelligence on to the development of the Aircraft Industry.

I take it that one of our biggest potential markets in peace-time lies in the inauguration and maintenance of passenger and mail services in and between countries where other forms of transport and communication are not all they might be. If this be so, we want to teach the Trade Commissioner, and through him the Governments of those countries, to view the problem of express passenger and mail services in terms of aircraft.

This is a point of view that is still novel, despite the lessons of the war.

Take Australia, for example. Australians have reconciled themselves to the idea that the journey from Melbourne to Perth cannot occupy less than a certain number of days. Nobody troubles himself over developments which are dependent on reducing the journey by 90 per cent. But it is time to review the whole position.

How could Australia benefit, directly or indirectly, by bringing her chief centres much closer together?

I do not know. I doubt if anyone knows. But I suggest that nobody has bothered about what has been assumed to be an impossibility.

Now it is nothing of the kind. It is the point of view that needs adjusting, if aircraft are to come promptly into their own.

The Trade Commissioner can effect the adjustment if we give him the material for the work, and imbue him with the Industry's own knowledge of what it can undertake and successfully perform, and at approximately what price the thing can be done.

Would it not be worth while to prepare a little informative statement for this particular purpose, and to arrange to keep well in touch with the Trade Commissioners, reminding them periodically of our requirements, and thus keeping our industry well up the list of those which they will try specially hard to help?

No man can be equally interested in everything. The Trade Commissioner, like anyone else, will find that he can do the best work for those industries whose needs he understands—that is to say, for those who take the trouble to explain their needs to him.

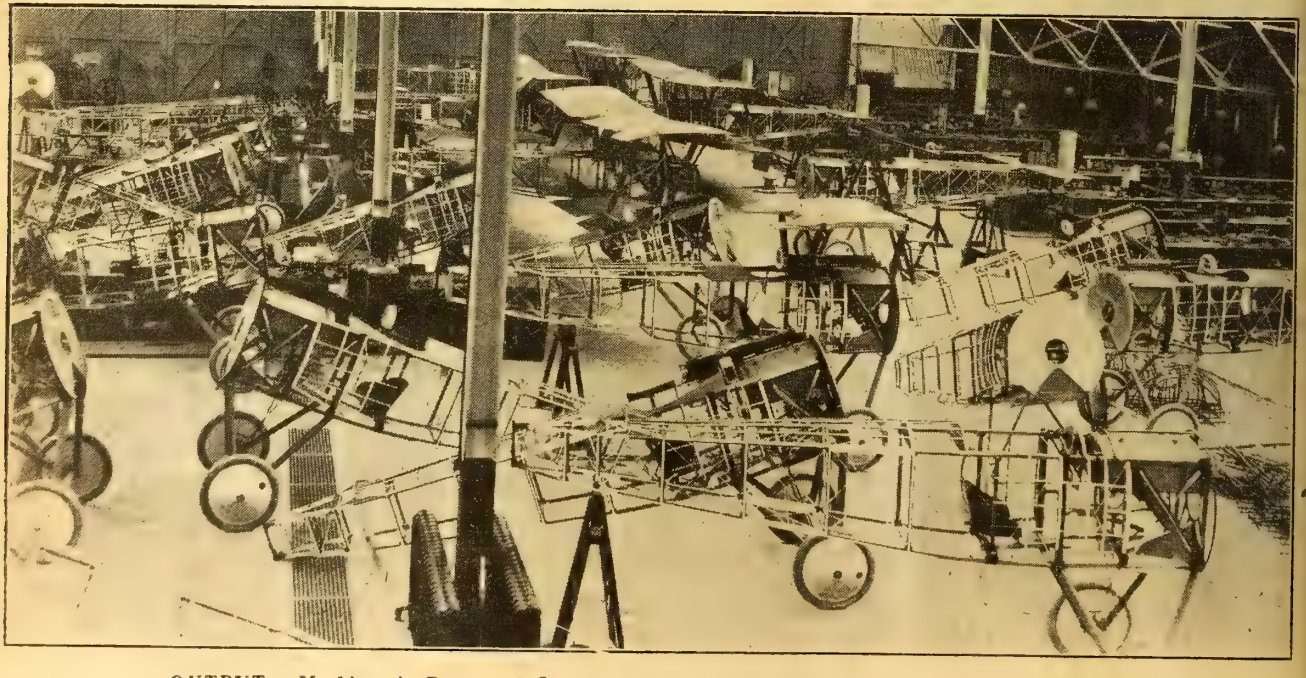
On the other hand, those which neglect him are pretty certain to be neglected by him.

Surely, then, it is up to us to ask him to inculcate our point of view into all and sundry during his travels, and to let him know what sort of information we want on such subjects as the inadequacy and slowness of railway services, the lack of roads, the loss of business due to poor postal facilities, the need for prospecting undeveloped areas, and so on.

With such information in our possession we could prepare schemes for aerial services that are actually needed, and get straight into touch with the right officials—indicated by the Trade Commissioner in each case—before whom to put them.

Out of this real business should result.

MEDWAY.



OUTPUT:—Machines in Process of Construction at the Standard Motor Co.'s Works.

WESTLAND Aircraft.

WESTLAND AIRCRAFT WORKS.
BRANCH OF PETTERS LIMTD.
YEOVIL.

Phone, Yeovil 141. Telegram Aircraft Yeovil.



The "Guardian Angel" Parachutes

THE GUARDIAN ANGEL PARACHUTES
TRADE MARK
(REGISTERED)

THE CLASS OF OUR LIFE-SAVING EQUIPMENT.

The basic characteristics of our Parachutes, which differentiate them from all others, and for which we hold master-patents, are automatic (i.e., compellative) opening, and static and kinetic control (i.e., control at rest and in action) of all their component details. The ordinary parachute is under no sort of control, and what we have accomplished is to convert this most insubordinate Apache of the Air into a staid servitor, incapable of acting in any other than the designed way. We have made the Parachute into an automatic machine, so that failure to open and entanglement of rigging has become a physical impossiblity. Every Type of Parachute made by us possesses these paramount and indispensable principles of machine action. The aviator makes his jump, and the Parachute automatically does the rest.

THE RANGE OF OUR LIFE-SAVING EQUIPMENT.

Life-saving Parachutes for school machines on the Training Grounds.

Life-saving Parachutes for heavy bombing machines, fighters, and scouts.

Life-saving Parachutes with minimum weight and without additional air resistance for the fastest machine that flies, and capable of release from any vertical or horizontal angle, or when flying upside down.

Solo-Parachutes for use from Airships and Observation Balloons, with a high but constant-speed initial-drop from a fired gas-bag, automatically opening into the low-speed descent required for a safe landing.

Basket-Parachutes for instantly detaching the basket containing two observers, their instruments and records, from a fired gas-bag, with high-speed initial fall, changing automatically to slow-speed descent for the safe landing. Parachute instantly released on landing, to avoid dragging the basket.

Variable-speed Parachutes, to permit a sudden high-speed drop, controlled by the Parachutist, to escape from an enemy aeroplane, and to stop on any portion of the grade of descent to avoid an objectionable landing. This variable-speed apparatus is applicable to the whole range of our Parachutes.

Non-spinning shock-absorber slings, taking all shocks off Parachute and man.

Aviator's Harness, distributing the stresses over those parts of the body best able to sustain them, and instantly releasable when alighting on land, on a roof, in a tree, or in water.

OUR EQUIPMENT IS THE RESULT OF ENGINEERING SCIENCE APPLIED TO DIFFICULT AIR PROBLEMS. WE BELIEVE THAT ITS EXTENDED USE WILL DOUBLE THE FLYING LIFE OF OUR FIGHTERS AT THE FRONT.

RELIABILITY—First. RELIABILITY—Second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S AERIAL PATENTS, LTD.

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines): London Wall 3266 and 3267. Telegraphic and Cable Address: "Savemalivo-Ave-London."

Contractors to H.M. Admiralty, War Office and Foreign Governments

The BRITISH CAUDRON CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office and Works:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 4647 4648 HAMPSTEAD

Scottish Factory and Aerodrome:

ALLOA.

Cable and Telegraphic Address: "CAUDROPLAN, ALLOA." Phone: 52

Allen's Steels

For Motor Cars
For Aeroplanes

Write for this Book.

IN Aircraft and Aeroplane-part manufacture the precise **character** of the Steel used makes all the difference. Endless trouble and loss are avoided by using for each part the one Steel which has **all** the qualities required for that part, and has been worked-out with knowledge of the practical engineering requirements.

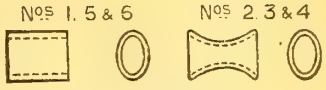
Allen's Catalogue D (3rd Edition) contains valuable information on Steels for Aircraft and Motors.

WRITE FOR IT NOW.

Edgar Allen & Co. Ltd.
Imperial Steel Works, Sheffield.


SMALL FERRULE.
PATTERN "A."

WE CAN SUPPLY THESE AT ONCE



SMALL FERRULES
PATTERN "C"

IN VARIOUS GAUGES AND LENGTHS
- SEND FOR FULL PARTICULARS -

FERRULES FOR AIRCRAFT WORK

THE AEROPLANE STEEL TUBE AND PRESSWORK ARTIFICERS


SMALL FERRULE.
PATTERN "B."

ACCLES & POLLOCK LIMITED

OLDBURY **BIRMINGHAM**

Telegrams: "ACCLES," OLDBURY Telephone: OLDBURY 111 (4 lines)
A.B.C. CODE, 5th Ed.


SMALL FERRULE
PATTERN "D"

H. & O., Ltd.

Harris & Others, Limited,

AIRCRAFT CONSTRUCTORS,

Old Town, Clapham, S.W.4.

Phone: Battersea { 1238 / 1047

WOODWORK, METALS, COVERING AND DOPING.

Sub-Contractors to leading Aeroplane Builders.
On Admiralty and War Office Lists.

HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON

W. CANNING & Co.

Lustre Works, Gt. Hampton Street.

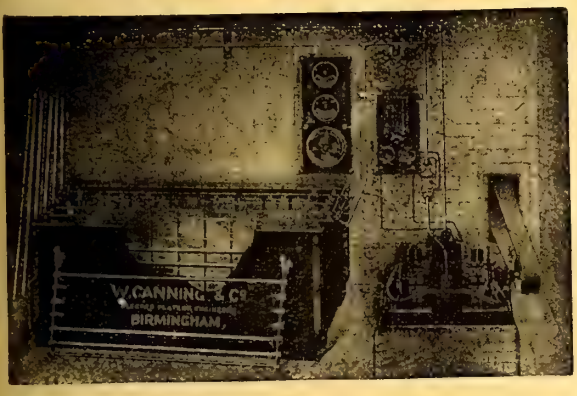
AND 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

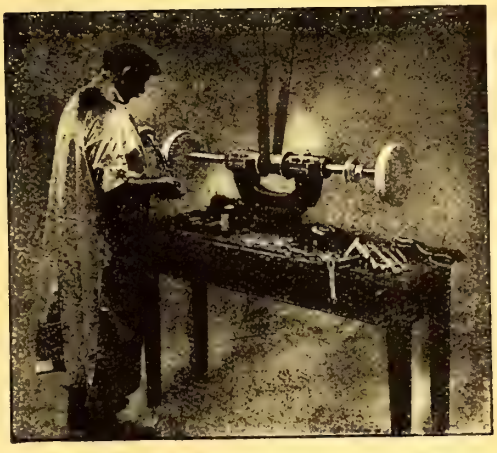


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.





VARNISHES . . .
for AEROPLANES

(SUBJECT TO A.I.D. INSPECTION)

AIRSCREWS, SPARS, STRUTS, STAYS, ETC.

ROBT. INGHAM CLARK & CO. LTD.

Offices: Walter House, Bedford St., Strand, W.C.2.
Telegrams—Pearline, Westrand, London. Telephone—Regent 3923.

Works: West Ham Abbey, London, E.1.
Telephone—East 955, 956.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

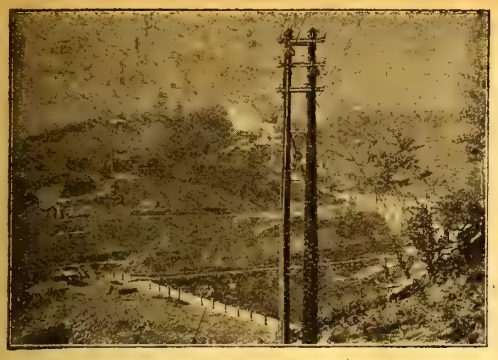
Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

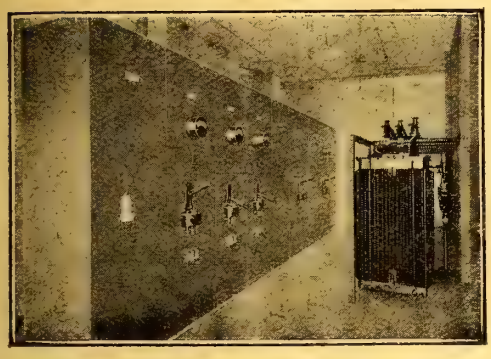
Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

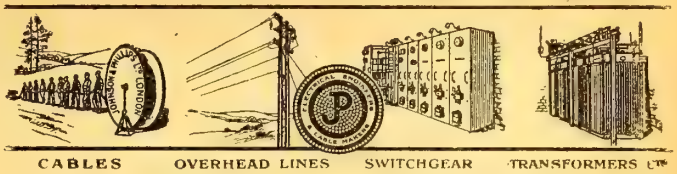


Electric Power Line.—Junction between Overhead and Underground Sections.



Switchgear and Transformers in Works Sub-Station.

SPECIALISTS IN ELECTRICAL TRANSMISSION AND DISTRIBUTION



CABLES OVERHEAD LINES SWITCHGEAR TRANSFORMERS Etc.

ELECTRIC POWER

Please send us your enquiries for any Cabling or Overhead Line Work, Switchgear, Transformers, Motors, Lamps or Wiring Accessories.

We are large Manufacturers of all such Plant and Material.

Complete Installations contracted for.

12, UNION COURT, OLD BROAD ST., LONDON, E.C. 2

Telegrams "Jung" London

JOHNSON AND PHILLIPS LTD
ELECTRICAL ENGINEERS & CABLE MAKERS
CHARLTON, LONDON, S.E. 7.

Telephone 400 Greenwich

BIRMINGHAM 108, Corporation St. CARDIFF 9, Park Place. GLASGOW 159, W. George St. MANCHESTER 251, Deansgate NEWCASTLE-ON-TYNE 44b, Blackett St PORTSMOUTH Cleveland Rd Gosport

WARING & GILLOW LTD

Furnishers & Decorators to H.M. the King

CONTRACTORS TO THE WAR OFFICE AND ADMIRALTY.

LIVERPOOL · HAMMERSMITH LANCASTER

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

HEAD OFFICE
OXFORD ST. W.1

TELEPHONE No.:
HAMMERSMITH 1980

TELEGRAMS:
"Warings Factories, Hammersmith."



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy. London. Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420
Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 012.
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.
Short Bros. Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.
Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand & Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 7846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1313
Rubery, Owen & Co., Darlaston, South Staffs.
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300

Clothing—

Burberry's, Ltd., Haymarket S.W.1. Regent 2165
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728. "Aviduction, Phone, London."
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681
The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300.
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co. 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.
Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3900.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1910.
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3096.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654-5-6.
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton." Wolverhampton
The Gnôme & Le Rhône Engine Co., L 47, Victoria Street, S.W. "Eleven London." Walthamstow 408 (2 lin

Electrical Accessories—

Belling & Co., Derby Road Works, Montag Road, Upper Edmonton, N.18. "Belli Edmonton." Tottenham 10
Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 15
Mann, Egerton & Co., Ltd., 177, Clevela Street, London, W.1. "Installing, E road, London." Museum
Premier Electric Heaters, Ltd., 258, 259, a 360, Bradford Street, Birmingham. "F renheit, Birmingham." Midland
The Rotax Motor Accessories Co., Ltd., V toria Road, Willesden Junction, N.W. "Rodynalite, Phone, London."

Electric Cables—

Willesden 24

E. Kalker & Co., Coventry. "Kalker, Cove try." Coventry 2
Johnson & Phillips, Ltd., Charlton, Londo S.E.7. "Juno, London." Central 2207, London Wall 15

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosl Street, Manchester.
Johnson & Phillips, Ltd., Charlton, Londo S.E.7. "Juno, London." Central 2207, London Wall 15

Electro Platers and Meta Polishers' Engineers—

W. Canning & Co., 133-137, Great Hampt Street, Birmingham. "Materials, Bi mingham." Birmingham 3622 Central (3 line

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, Lo don, S.W.1. "Edibrac, 'Phone, London 3540 Victoria (3 lines

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditc "Springs, Redditch." Redditch 6

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Vi lage, Bournemouth. "Etches, Winton." Bournemouth 116
Cambridge School of Flying and Aerodrome Co 308, St. Andrews St., Cambridge, "Ca bon, Cambridge." Cambridge 5 and 108

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavemen House, London, E.C.2. London Wall 573 and 617

Galvanising—

Boulton & Paul, Ltd., Rose Lane Work Norwich. "Aviation, Norwich." Norwich 8
The Rustless Iron (Cowper Coles Process Ltd., 1, French St., Sunbury-on-Thame Middlesex. Sunbury 3

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston Birmingham. "Mosgear, Birmingham."

Glue—

East 40

Central Chemicals, Ltd., 283, West End Lane London, N.W.6. "Entramical, Westhamp London."
Improved Liquid Glues Co., Ltd., Gt. Herm tage Street, E. (Croid.). "Excroiden Wapp, London." Avenue 3178
Mendine Co., 8, Arthur Street, E.C. Bank 5873
Oldroyd, Wm., & Sons, Ltd., 9, Mincing Lane E.C.3

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy London." Regent 1340

Gauges—

J. A. Prestwich & Co., Northumberland Park Tottenham, N.17.

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 65a Southwark Street, London, S.E.1. "Kinnell London." Hop 372 (2 lines)

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Com mercial Wharf, Lambeth, S.E. "Gabriel son, Watloo, London." Hop 718
Robert Young's Construction Co., Ltd., Canon bury Works, Canonbury Street, Essex Rd. London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 1308

Instruments (Scientific, Altimeters, etc.)—

The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge" Cambridge 642.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180

Buyers' Guide.



ne Tools—

er. & Co., 11, Queen Victoria Street, C.4. "Circumfuse, Cannon, London." City 768

to Driving Pieces—

t Terry & Sons, Ltd., Redditch. prings, Redditch." Redditch 61

tos—

Thomson-Houston Co., Ltd., Lower Ford eet, Coventry. "Asteroidal, Coventry." Coventry 278.

-L Magneto Syndicate, Ltd., Victoria rks, Coventry. "Corlton, Coventry." Coventry 1008-1009.

ritish Lighting & Ignition Co., Ltd., Tottenham Court Road, W.1. "Vicks-, Phone, London." Museum 430.

Manufacturing Co. (Berling Magneto), falo, N.Y., U.S.A.

Manufacturers—

, Chas., & Sons, Ltd., Birmingham. ifford, Birmingham." Central 42-43.

in General— Avenue 1432

, J. B., & Son, 30, St. Mary Axe, E.C.3.
Co., 46, Fencharch Street, London,
3- "Poetry, Fen, London."
Avenue 005, 006, and 7006
Mercer & Co., 198, Upper Thames et, E.C.4. "Reconciled, Cannon, don." City 6342.

Parts and Fittings—

& Pollock, Ltd., Oldbury, Birmingham. cles, Oldbury." Oldbury 111 (3 lines).
Supplies Co., Ltd., Ascot House, 125, g Acre, W.C.2 "Upcast, Rand, don." Gerrard 276 (2 lines).
& Harrison, Ltd., Hythe Road, Willes-Junction Willesden 2297.
Jones & Bayliss, Ltd., Wolverhampton. lts and Nuts.) "Bayliss, Wolverhamp-" Wolverhampton 1041.
rmingham Guild, Ltd., 45, Gt. Charles et, Birmingham. "Handicraft." Central 3705.
rn Aeroplane & Motor Co., Ltd., mpia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Metal (Kingston), Ltd., Kingston-on mes.
J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
d Rim and Tube Co., Lombard Street, mingham. Lombardic, Birmingham." Midland 211 (2 lines).
Egerton & Co., Ltd., 177, Cleveland et, London, W.1. "Installing, Eus-, London." Museum 70.
ord, Fredk., Ltd., Fremo Works, Lif-i, Birmingham. "Fremo, Birmingham." Kings Norton 261.
on, J. H., & Co., 1, Albemarle Street, ndon, W.1 Regent 3996.
, Owen, & Co., Darlaston South Staffs.
, Joseph, & Sons, Ltd., Wellington. opshire. "Sankey, Wellington, Salop." Wellington 66.
alvo Engineering Co., Ltd., 10 to 16, he Street, High Holborn, London, W.C.1. alvipult, Phone, London." Holborn 410.
lsdon Aero & Engineering Co., Ltd., Albemarle Street, Piccadilly, W.1. Selaero, Phone, London." Regent 1181.
rcraft Construction Co., Harlev Works, kton Road, E.16. "Aercracons, Canning, ndon" East 1300
otax Motor Accessories Co., Ltd., Vic-ia Road, Willesden Junction, N.W.10. odynalite, Phone, London." Willesden 2480.
son Bros., Ltd., Bradley, Bilston. hompson Bros., Bilston." Bilston 10.
Engineering Co., Ltd., Old Oak Com-n Lane, Willesden Junction, N.W.10.

Shearing Tools—

omery, Smith, & Co., Ltd., Tangent orks, Keynsham, near Bristol. "In-nuity, Saltford." Keynsham 21.

Spinnings—

& Sons, Standard Works, Lawrence ad, Tottenham, N.15. "Instruments, ndon." Tottenham 2370-1.
& Co., 4 and 5, A B Row, Birming-m. "Gabriel, Birmingham." Central 1223.

Bolts—

ore Bros., Zota Works, Hildreth Street, tham, S.W Battersea 415.
Owen & Co., Darlaston, South Staffs.

ellaneous—

son, D., & Son, Ltd. (Roofs), Belfast. Anderson, Belfast." Belfast 4033-4034-4035.
n Wire, Ltd., Willesden Junction, Bowirelim, Harles, London." Willesden 2400 (3 lines).
Metal (Kingston), Ltd., Kingston-on-hames.
Bros., Ltd., Great Eastern Street, C.2. "Imbrowned, Bethroad, London." London Wall 6300.
rt Flood Co., Ltd., Chapel-en-le-Frith. Frodobrake, Birmingham." Central 793.

London Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston-road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts.
Foster Instruments, Letchworth. Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3473.

Shackles—

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
British Metal (Kingston), Ltd., Kingston-on-Thames.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igmiter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.
James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London." Victoria 5073, 4210.
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
J. Owen & Sons, Ltd., 109a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The Aeroplane Buyers' Guide

Acceptance and Experimental Flights—
The Prodger Rose Aviation Co. "Aeronaut, Piccy, London" Gerrard 278 (2 lines)

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edilec, Phone, London." Victoria 3340

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London" Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne "Armstrong Aviation, Newcastle-on-Tyne" Gosforth, 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol "Aviator, Bristol" Bristol 3091
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudronian, Cricle, London" Hampstead 555.
Central Aircraft Co., Peterston Works, High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4128 and 4324
Dawson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1902 (3 lines)
Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne" Eastbourne 1470
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon "Vulpine, Hyde, London" Kingsbury 180
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydrophil, Crickle, London" Hampstead 7400
Hooper & Co., Ltd., 54, St. James St., Piccadilly, London, S.W. "Sociable, St. James, London." Regent 612
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet "Martinsyde, Weybridge" Weybridge 331; Byfleet 171.
National Aircraft Co., Ltd., 15, Hendon Road, N.E.2. London Wall 6725
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2 "Nieuscout, Crickle, London" Willesden 2455
Norman Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48
The Regent Carriage Co., Ltd., 122-124, New King's Road, Fulham, S.W.6 "Carbodies, London." Putney 2240-2241
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester" City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 744
Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignush, Estrand, London" City 89
Vickers, Ltd., Imperial Court, Bull Street, Knightsbridge, S.W.1 "Vickerfels, Knights, London" Kensington 5810
Waring & Gillow, Ltd., Hammersmith "Warsesen Ox, London" Museum 5000
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 129
White & Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84.

Airships—
Airships, Ltd., High Street, Merton "Airships, Ltd., High Street, Merton" Wimbledon 1314
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378

Aluminium Castings (Sand & Die)
Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 7846

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds" Central 3927.

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Peeries, Fen, London" Avenue 695, 696 and 7046.

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1415
Rubery, Owen & Co., Darlaston, South Staffs. The Wiffley Co., Ltd., Salisbury House, London, E.C. "Wraffley, Phone, London." City 9081-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Carburettors—
Hobson H. M., Ltd., 20, Vauxhall Bridge Road, S.W.1 Victoria 4070

Casein—
Newsholme Sons & Co., Ltd., 5, Hanover Square, London, E.C.3 "Surrogate, London" Avenue 34 and 35

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham"

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Celluloid (Non-Flam.)—
Greenall & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 1306-7
London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London" East 1300

Clothing—
Burberrys, Ltd., Haymarket, S.W.1 Regent 2165
Dunhill, Ltd., Euston Road, N.W.1 "Dunhead, London" North 3405-6

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Central Aircraft Co., Peterston Works, High Rd., Kilburn, N.W.6, Hampstead 4128 "Aviduction, Phone, London"
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond "Actros, Richmond"
Richmond 1681
H. Aircraft Construction Co., Hooper Works, Beckton Road, E.16 "Aerocraco, Canning, London" East 1300
Thompson Bros (Bilston), Ltd., Bradley, Bilston, England "Thompson Bros, Bilston" Bilston 10

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1 And at Glasgow City 3115

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1 "Tetrafree, Piccy, London" Gerrard, 2312
British Cellulose Co., 8, Waterloo Place, S.W.1 "Cellulate, London" Regent 4196
The British Emaillite Co., Ltd., 40, Regent Street, S.W.1 "Ridleypren, Piccy, London." Gerrard 280
Cellon, Ltd., Broad Street House, New Broad Street, E.C.2 "Ajawo, London" London Wall 5359-3622
Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Perfume, Westrand" Regent 3923

Engines and Parts—
Allen W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford" Bedford No. 1
Arrol Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282.
The Beaute School of Flying, Ltd., The Broadway, Cricklewood, N.W.2 Hampstead 1900
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1 "Aeroflight, Vic, London" Vic 7026
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge" Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith" Hammersmith 1910
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Robertson J. H., & Co., 1, Albemarle Street, London, W.1.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolloyd, London" Gerrard 1654-5-6
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton"
The Gnome & Le Rhône Engines, 47, Victoria Street, S.W. Victoria 2207
Wolseley Motors, Ltd., Adderley Park, Birmingham "Wolseley, Birmingham" Midland 2201

Electrical Accessories—
Belling & Co., Ltd., Bleak Hall Works, Bleak Road, Upper Edmonton "Belling, Edmonton"
Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Greenwich 2207, London Wall 7676
Mann, Egerton & Co., Ltd., 356, Euston Road, London, N.W.1 "Mantyre, London" Museum 4970
Premier Electric Heaters, Ltd., 250-254, Broad Street, Birmingham "Premo, Birmingham" Kings Norton 261
The Rotax Motor Accessories Co., Ltd., Willesden Junction, N.W.10 "Rotaxias, Phone, London" Willesden 2480

Electric Cables—
E. Kuller & Co., Coventry "Kuller, Coventry"
Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Greenwich 2207, London Wall 7676

Electric Lighting and Power—
Siemens Brothers & Co., Ltd., Woolwich, S.E. "Siemens, Woolwich" Woolwich 1044
Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Greenwich 2207, London Wall 7676

Electro Platers and Metal Polishers' Engineers—
W. Canning & Co., 143-147, Great Hampton Street, Birmingham "Metaplate, Birmingham" Birmingham 3622 Central

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edilec, Phone, London" Victoria 3340

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Flying Schools—
Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth "Etches, Winton, Bournemouth"
Cambridge School of Flying and Aerodrome, 6308, St. Andrews St., Cambridge "Cambridge, Cambridge" Cambridge 308
Furniture (Office)—
Cooke's (Hoxton), Ltd., Tinsley Park House, London, E.C.2 London Wall 573-5-6-7

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
The Rustless Iron (Cooper Coles Process), Ltd., 6, French St., Sunbury-on-Thames, Middlesex Sunbury 5

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham "Mosgear, Birmingham" East 40

Glue—
Central Chemical Co., Ltd., 283, West End Lane, London, N.W.6. "Entrainsul, Westand, London"
Improved Liquid Glues Co., Ltd. (Crold), 61, Heritage Street, E. "Eskrodo, Wapp, London" Avenue 3768
Meadows Co., S., Arthur Street, E.C. Bank of Oldroyd, W. H., & Sons, Ltd., 9, Mincing Lane, E.C.3
Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros, Bilston" Bilston 10.
Wolter Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
Montgomery, Smith, & Co., Ltd., Tangent Works, Kingsdown, near Bristol "Intangent, Stapes" Keynsham 21.

Metal Spinnings—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1.
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Metric Bolts—
Catterson Bros., Zora Works, Hildreth Street, Battersea, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs.

Miscellaneous—
Anderson, J. & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast" Belfast 4033-4034-4035.
Bowden Wire, Ltd., Willesden Junction, N.W.10 "Bowdenite, Harles, London"
Britannia Metal (Kingston), Ltd., Kingston-on-Thames Kingston 1400 (3 lines).
Brotherhood, Peter, Ltd., Great Eastern Street, E.C. "Imbrowned, Bethrood, London" London Wall 6300
Burt, Boulton & Hayward, Ltd., Chapel-en-le-Frith, Stockport "Frodobrake, Birmingham." Central 793.
London Label Co., Ltd., Hatley Works, Beckton Road, E.16 "Nonflamoid" Nonin flammable Celluloid "Lonlabel, Canning, London." East 1300
MacLennan, J., & Co., 30, Newgate Street, E.C.1 and at Glasgow Tapes, Cords and Thread. City 3115

Motor Cars—
Arrol Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282
Mann, Egerton & Co., Ltd., 356, 358, Euston Road, London, N.W.1. "Manegeer, Lowrood, London" Museum 70
Standard Motor Car Co., Coventry "Standard, Coventry" Coventry 230 (4 lines)

Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston-on-Thames Kingston 1400 (3 lines)
The Clogg Metal Engraving Co., Chatsworth Works, Worthing "Clogg, Worthing"

Observation Panels—
Triplex Safety Glass Co., Ltd., 11, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London" Regent 7340

Parachutes—
L. R. Calthrops Aerial Patents, Ltd., Lidon Street House, Lidon Street, London, E.C. "Save-a-life, Ave, London" London Wall 3266-3267

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743

Piston Rings—
British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 743

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1.

Power Presses and Dies—
Bliss, E. W., & Co., 24, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London" Hop 4340

Presswork—
Rubery Owen & Co., Darlaston, South Staffs.
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Liberty Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Liberty, Kingston" Kingston 1...
Integral Propeller Co., Ltd., Aeroprop, Hyde, London Hendon 9, Kingsbury 1...
Lang Propeller, Ltd., Weybridge "Aeroducks, Weybridge" Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (4 lines)
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil "Aircraft, Yeovil." Yeovil 129

Pyrometers—
The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 26

Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield" Wakefield 466

Rubber Tubing & Accessories—
Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812

Safety Belts—
Holmes, C. H. & Son, 58, Albert Street, Manchester "Seabelt, Manchester" City 4432

Screw-driving Machines—
Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines).
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (4 lines)
The Norman Thompson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 48.
Short Bros., Rochester "Seaplanes, Rochester."
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edilec, Phone, London" 3340 Victoria (3 lines)
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxias, Phone, London" Willesden 2480

Seats for Aeroplanes—
Bowser, J., Art Cane Works, 50, Park Lane, Leeds Central 3473

Shackles—
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxias, Phone, London" Willesden 2480

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1
Wickman Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345
W. H. Briscoe & Co., Ltd., 31 and 32, Peck Street, Birmingham "Briscoe, Birmingham" Central 550
British Metal (Kingston), Ltd., Kingston-on-Thames Kingston 1400 (3 lines)
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham East 497 Birmingham
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4830
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1
British Metal (Kingston), Ltd., Kingston-on-Thames Kingston 1400 (3 lines)
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4830
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Selaero, Phone, London" Regent 1181
Arthur Hill & Co., Silchester Road, North, Kensington, W. Park 1443

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Lodge, Rugby" Rugby 242
Ripault, Eng. & Co., Ltd. (Oleo Plugs), 640, Pedmil Street, W.1 "Ripault, Reg, London" Gerrard 7756

Springs—
Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines)

Stampings—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1

Steel—
Firth, Thos. & Sons, Shatcliff "Firth, Steel, Field" Sheffield 3230 to 3237
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Nicklin, Bernard, & Co., Birmingham "Bernico, Birmingham" Smithwick 224

Steel Stamps and Markings—
John Meerlon & Sons, Cleveland Works, Cleveland Street, Mile End, E.1 "Dashur, Phone, London." East 3331 (2 lines)

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Freemo Works, Lifford, Birmingham. "Freemo, Birmingham" King's Norton 261-262

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Ettikosil, Vic, London" Victoria 5073, 4210
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham "Brown's Saw Mills, Wollaton." Nottingham 1526
J. Owen & Sons, Ltd., 1094, Borough High Street, S.E.1 "Bucheron, London" Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines).

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark, R. Ingham & Co., Walter House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers— Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3
Herbert Terry & Sons, Ltd Redditch "Springs, Redditch." Redditch 61

Vices—
C. and J. Hampton, Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Watchmakers and Jewellers (Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Barimar, Ltd., 10, Poland Street, W.1. "Bariquamar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

London Label Co., Ltd., Hadley Wor
Beckton Road, E.16. "Nonflamoid" Nor
flammable Celluloid. "Lonlabel, Canni
London." East 1

Wire Gauze—
N. Greening & Sons, Ltd., 16, Finsbury
London, E.C.2. "Setscrew, Finsqu
London." London Wall 1

Guthrie, J. B., & Son, 30, St. Mary Axe, E.
Avenue 1.

Wires and Cables (Aeroplanes)
Bruntons, Musselburgh, Scotland. "Wiren
Musselburgh." Musselburgh
Cradock, Geo., & Co., Ltd., Wakefield, E
land. "Cradock, Wakefield." Wakefield

Wirework— (3 lin
Terry Herbert & Sons, Ltd., Reddi
"Springs, Redditch." Redditch

Wood Refuse Suction G
Producers—
Ruston Proctor & Co., Ltd., Lincoln, Engla
"Ruston, Lincoln." Lincoln

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rail
Works, Rochdale. "Robinson, Rochda
Rochdale
Sagar, J., & Co., Ltd., Halifax. "Sawto
Halifax." Halifax
Wadkin & Co., Leicester. "Woodwor
Leicester." Leicester

By Royal Warrant of Appointment.

ESTABLISHED 1819.

ARNOLD & SONS,

Engineers and Instrument Manufacturers,

Sheet Metal Work, Sheet Metal Pressing, Stamping, Spinning, Acetylene Welding, Nickel Plating, Silver Plating, Electro Tinning, etc., etc.

STANDARD WORKS, LAWRENCE ROAD, TOTTENHAM, N.15.
Head Office: GILTSPUR STREET, E.C.1.

Telegraphic Address:—"INSTRUMENTS," LONDON. Telephone Nos.:—City Office: 5240, 5241, 5242 City. Factory: 2370 & 2371 Tottenham.



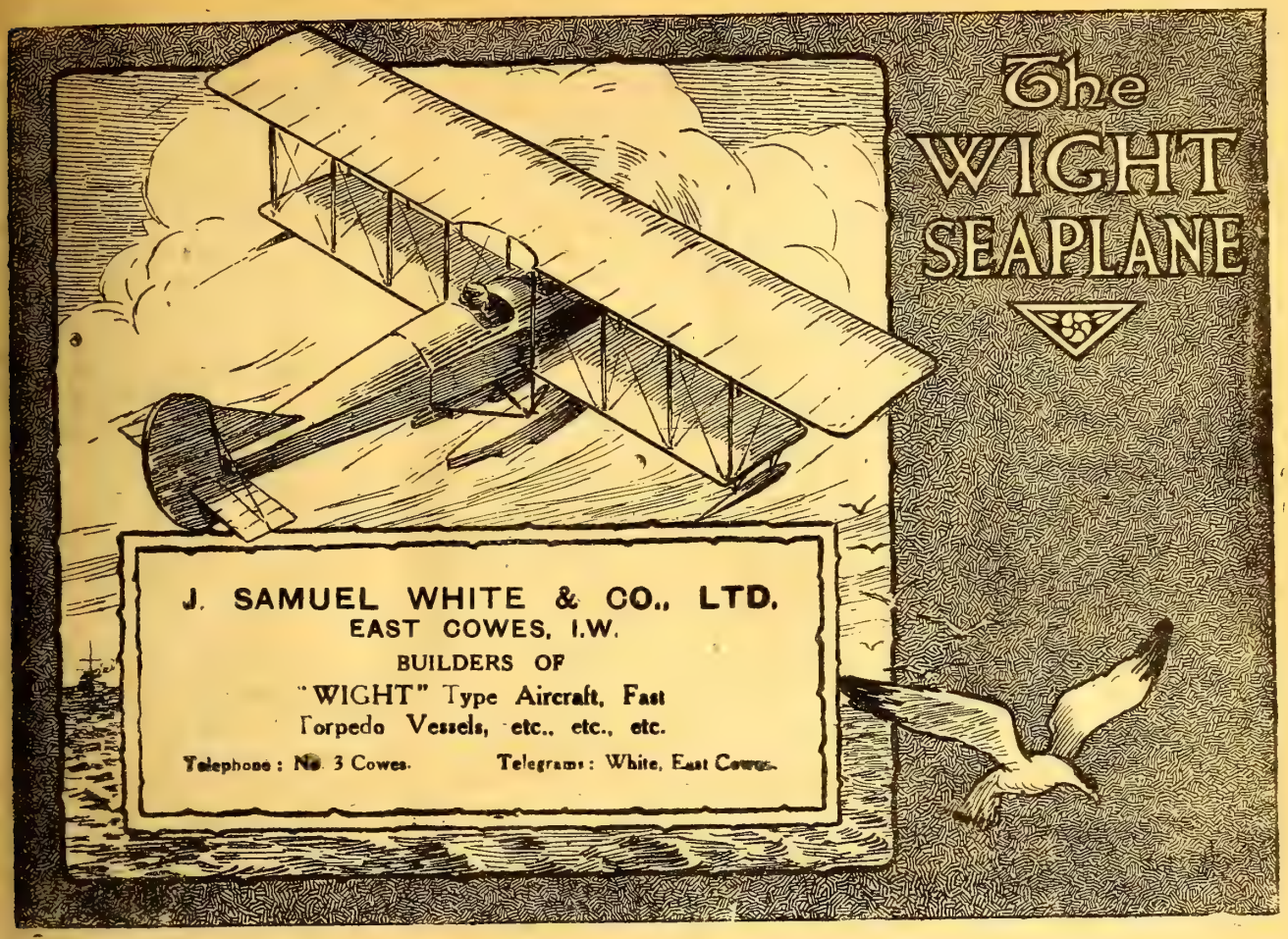
AERO ENGINE COMPONENTS

MANUFACTURED BY THE

SELSDON

Aero and Engineering Co. Limited

1, ALBEMARLE STREET, PICCADILLY, W.1.



Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

TWO COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

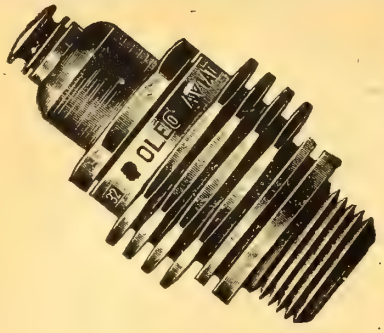
Addresses of our fine Saw Mills, Works, etc.,
— have been camouflaged by the Censor. —

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

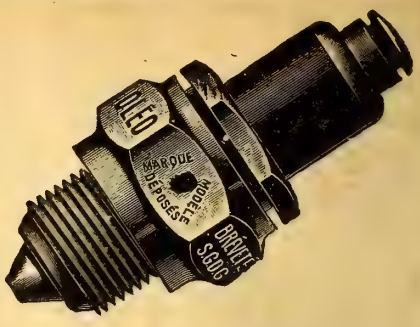
Specialities—BIG STUFF and BEST WORK.



TYPE No. 32.



"The Smile of Success."



TYPE No. 270.

OLEO were the first Aero Plugs ever made.
OLEO won the Aero Grand Prix SIX TIMES in succession.
OLEO Plugs have been supplied to the Government since 1913.
OLEO Aero Plugs have the "Largest Sale in the World."
OLEO Plugs have won over £30,000 in prizes.
OLEO Plugs were the first to Loop the Loop.
OLEO Plugs were the first to Cross the Alps.
OLEO Plugs are supplied to NINE Governments.

OLEO PLUGS
LEO RIPAULT & Co.
64A POLAND ST. LONDON, W.
TELEGRAMS RIPAULT REG. LONDON. TELEPHONE GERRARD 7758

CONTRACTORS TO THE AIR COUNCIL.

ESTABLISHED 1912

The SUPERMARINE Aviation Works, Ltd.

DESIGNERS & CONSTRUCTORS OF FLYING BOATS.

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN.
H. SCOTT-PAINE, Director & Gen. Manager.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Offices, Works, & Flying Waters—
SOUTHAMPTON, Eng.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

ENGINEERING EMPLOYERS' FEDERATION 1896

Telegrams
JONAS,
SHEFFIELD.

REGISTERED
I C NOVO
TRADE MARKS.

Telephone:
No. 4660.
Private Branch Exchange.

S.B.A.C. Society of British Aircraft Constructors

SIR JOSEPH JONAS, COLVER & Co., Ltd.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, Ltd.

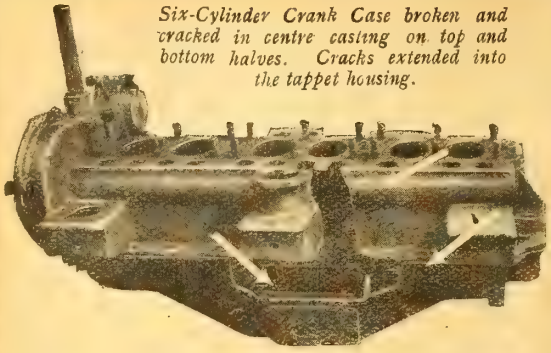
CONTRACTORS TO H.M. GOVERNMENT.

OFFICE AND WORKS—

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON



Six-Cylinder Crank Case broken and cracked in centre casting on top and bottom halves. Cracks extended into the tappet housing.

Barimar Repairs are Permanent

IF there is one outstanding merit in Barimar Scientific Welding Service it is the permanency of Barimar repairs.

Barimar aims first at efficiency of service, for that is what counts in the long run. Price is measured only by service, so it pays to give just enough to buy security and worth.

Barimar repairs all metals under a guarantee of satisfactory service.

Cylinders, Crank and Gear Cases, Crank Shafts, Radiators, Lamps, Chassis Frames, Machinery Parts, Fly-wheels, Engine Cases, Boilers, Ship and Railway Work, Frost-cracked Cylinders and Radiators get special attention. We never fail on Aluminium work.

Do you want a copy of our
NEW MANUAL ?

"The Welding Test" is published at 6d., but we have a few copies left and shall be pleased to present one to any reader of "The Aeroplane" who has a fractured metal part to repair. Ask for Manual "B.C." and mention "The Aeroplane," please.

Send Your Repairs to Barimar

Strip all fittings, label with your name and address, send by passenger train if weight permits. Goods rail consignments must be carriage paid. Advise us by post when goods are sent.

Address Repairs to Dept. "B.C."—

BARIMAR

LIMITED,
10, Poland Street, London, W.1.

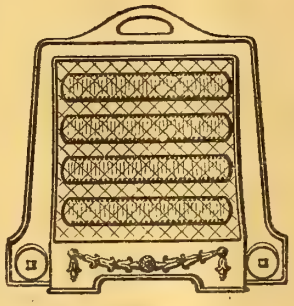
Telegrams: Bariquamar, Reg. London. Telephone: Gerrard 8173.



Six-Cylinder Crank Case after repair by Barimar with welded parts machined, lined, and cleaned up. No distortion took place and the welded portions could not be seen. A permanent repair.

BELLING
ELECTRICAL ACCESSORIES

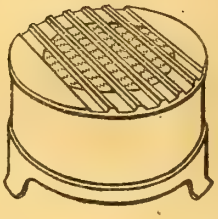
AIRCRAFT Manufacturing Purposes.



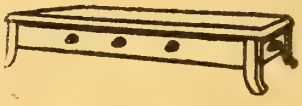
ELECTRIC FIRE.
Office Pattern. List No. 617.
An ideal fire for small offices, waiting-rooms, passages, etc. We have also supplied a large number to Aerodromes for general heating. Numerous other designs are available.
Price **35/-**
Dimensions—Height 17⅜ in., Width 17¾ in., Depth 5¾ in.



ELECTRIC AIR WARMER.
List No. 960.
A reliable low temperature heating appliance, suitable for work rooms, etc. Can be used in any position without risk of fire.
Price **25/-**
Dimensions—Length 15½ in., Width 6½ in., height 4⅜ in.



ELECTRIC BOILING RING. List No. 7.
This will do all the same operations as an ordinary gas ring. Used for heating glue pots, and when loaded at 250 watts can be attached to any electric lampholder.
Price **15/-**
Diameter 7 in.



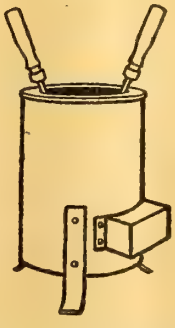
ELECTRIC HOT PLATE. List No. 18
Useful for keeping food warm, and also for drying purposes of all kinds.
Price **100/-**
Size 36 in. by 18 in.



ELECTRIC IMMERSION HEATER.
A reliable appliance for heating water, oil and other liquids. Can be easily fitted to existing tanks, etc.



ELECTRIC ENGINE WARMER.
For placing under engine in cold weather to prevent freezing. They are quite gas and fireproof.
Price **40/-**
Size 12 in. by 7 in.



ELECTRIC SOLDER POT. Type A.
This is the latest system for heating ordinary soldering irons, and consists of a pot of molten solder into which the irons are placed for a short time till heated.
Price **65/-**
Dimensions—Outside diam. 8 in., inner pan 5⅛ in. diam. at top, Depth 7 in.

All the above prices are subject to an advance of 25 per cent.

Our Catalogue illustrates many other special appliances we make for Manufacturing Purposes, Munition and Factory Work, Hospitals, Mess Rooms, etc.

BELLING & CO., *MANUFACTURING ELEC. ENGRS.,*
DERBY RD. WORKS, MONTAGUE RD., EDMONTON, LONDON, N. 18

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

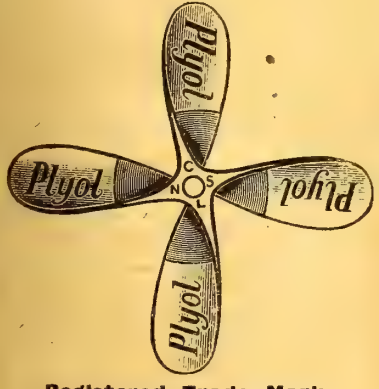
Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street Works, BIRMINGHAM.

"PLYOL"

THE BEST CEMENT FOR THREE-PLY, Veneering, etc.



Registered Trade Mark.

ALDGATE CASEIN WORKS.

NIEUWHOF, SURIE & Co., Ltd.

HEAD OFFICE

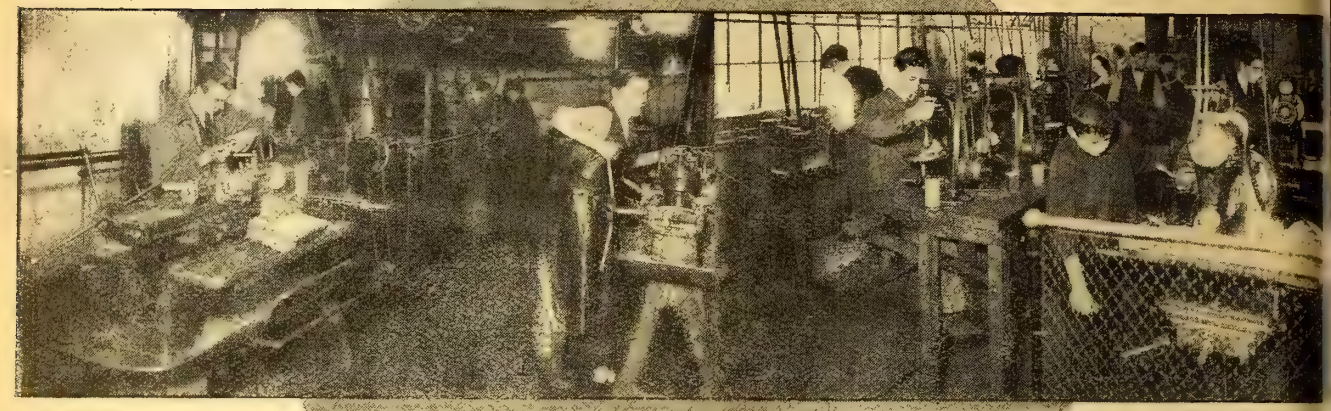
5, Lloyds Avenue, London, E.C. 3.

Works:
ALDGATE AVENUE, ALDGATE, E.C.

Also Casein especially adapted for Waterproof Paints, Varnish, etc.

Telephones AVENUE 34, 35.

Telegrams: "SURICODON, FEN LONDON."



TRADE MARK
ASCOL
REGISTERED

CONTRACT WORK

The Three "P.'s"

Precision, Promptitude, and Price—these are the Three Dominant Factors in the choice of an organisation to do your contract work for you.

We suggest ourselves. There are reasons for the suggestion.

First, with regard to Precision—our organisation and system of production ensures that you get what you want always.

Secondly, you are assured of Promptitude because our organisation is big enough and efficient enough to deal with your requirements without delay. You get what you want, when you want it.

Thirdly, as to Price—let us quote you, and you will find we can show you advantages.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

Head Offices, Showrooms, and Stores:

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

S.B.A.C. SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

G. H. MANSFIELD,
Managing Director.

Works:
Little James St.,
London :: W.C.1.

Telephone:
Gerrard ... ... 276.
Private Branch Exchange.

Telegrams:
"Upcast, Rand,"
London.

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

COPPER.—The American position.—The output of Copper is apparently well maintained, although it is not quite sufficient to meet all demands, and there is a feeling in certain quarters that an increase in the official price would have a beneficial effect on output.

The fuel and transport difficulties have eased considerably, and very little trouble is now being experienced.

Home Position.—There is very little change here. Supplies are well maintained and are entirely under official control.

TIN.—Stocks are very low and supplies are scarce; there is, however, a distinct sign of improvement. The Metal Exchange Committee, which is controlling this market, have the situation well in hand, and the control scheme instituted by them is working satisfactorily.

Prices have declined to a fairly reasonable figure and buyers are eager to procure the small quantities which are being offered.

There is an agitation for an all round increase in prices. This appears to be inevitable and it is more than likely that the Ministry will give their decision during the next fourteen days.

LEAD.—The position is unchanged. Supplies are not difficult to procure, and there appears to be plenty of old Lead available, due apparently to the authorities having paid special attention to the collection of Scrap Lead.

STEEL.—Although the demand for Steel continues to increase, supplies are fairly easy to procure. This, of course, does not apply to High Speed or Cast Steels. High Speed Steel is very difficult to procure, and there does not appear to be any indication that the situation is likely to become easier. Prices remain unaltered.

TIMBER.—The position of the Timber market is far from satisfactory. There is hardly any Silver Spruce coming into the country, and, apparently, one of the substitutes is not giving the satisfaction expected and large quantities of this wood have been imported on Government account.

The whole situation is in the hands of the authorities, and it is hoped that the results of the next four months will justify their apparent optimism. The American authorities appear to have investigated the Timber question very exhaustively, and one is indebted to the "American Lumbermen" for the chart which is reprinted giving detailed comparisons of the properties of various woods tested with the object of ascertaining the possibility of their use on aeroplanes.

It will be observed that the woods which compare very favourably with Silver Spruce, which is generally accepted as the ideal wood for aeroplane construction, are: Douglas Fir, Sugar Pine, Yellow Poplar and Cottonwood.

Other woods which compare fairly well with Silver Spruce are: Cypress, White Pine and Basswood. There is a huge demand for Douglas Fir in U.S.A. for aeroplane work, and it is reported that the United States Government are also asking all firms holding stocks of Sugar Pine to report them at once.

One or two good shipments of Mahogany and Walnut have been received during the past ten days. The Timber Controller has issued a new order and schedule of prices for Home Grown Timber. There is not, however, any alteration in the prices of English Ash.

FABRIC. — Supplies at present are fairly good. There is, however, some doubt about the certainty of future supplies, and it is understood that the Government are making provision for supplies of Cotton to be available in the event of Linen not being procurable. The whole situation hinges round the flax crop, and this in turn depends upon the weather. Special exertions are being made for a bumper crop.

The anxious period will, however, be between now and October, when the new crop of flax should be available. It is to be hoped that the Powers That Be have had sufficient forethought to conserve the stocks of Linen by using Cotton wherever practicable and laying by stocks to meet the huge demands which will be made for Fabric this summer.

CABLE.—The Ministry of Munitions has now fixed the prices of Flexible Steel Wire Rope, and a schedule of same is shown above on this page.

OFFICIAL PRICES OF STEEL CABLES.

Flexible Steel Wire Rope. (Spec. 2W., 2/11/17.)	Spec. item Nos.	Minimum Breaking Strength.	Maximum Diameter.	Construction.	Weight of 100 ft.	Issue Prices. Mat. issued up to and including 4/3/18.	Mat. issued on and after 5/3/18 & until further notice.
		cwt.	ins.		lbs.	£ s. d.	£ s. d.
(*a*) Extra Flex. Ropes	0	5	.075	4 x 7	1.0	3 10 5	3 14 0
	1	10	.075	4 x 19	2.0	6 6 6	6 12 10
	2	15	.137	,,	3.2	6 1 0	6 7 0
	3	20	.150	7 x 19	3.8	9 13 7	10 3 3
	51	25	.168	,,	5.0	9 7 0	9 16 4
	52	35	.195	,,	6.4	10 3 6	10 13 8
	53	45	.228	,,	9.0	11 0 0	11 11 0
	54	60	.262	,,	11.7	12 2 0	12 14 2
	55	70	.270	,,	12.4	12 3 0	12 14 8
	56	80	.305	,,	15.1	14 11 6	15 6 1
	57	100	.349	,,	19.6	17 6 6	18 3 10
	58	120	.378	7 x 27	22.5	23 2 0	24 5 2
	59	140	.388	,,	25.5	25 6 0	26 11 3
	60	160	.418	7 x 37	28.9	31 18 0	33 9 11
(*b*) Standard Straining Cords	41	10	.085	1 x 19	1.6	1 18 6	2 0 5
	42	15	.105	,,	2.3	2 8 5	2 10 10
	43	20	.125	,,	3.4	3 6 0	3 9 3
	44	25	.143	,,	4.3	3 19 9	4 3 9
	45	35	.161	1 x 37	5.5	5 10 0	5 15 6
	46	45	.189	,,	7.5	6 12 0	6 18 7
	47	60	.210	,,	9.3	8 5 0	8 13 3
	48	75	.238	,,	11.9	10 9 0	10 19 6
	49	90	.259	,,	14.1	12 2 0	12 14 2

The above prices include cost of inspection (previously carried out) and free delivery to nearest Goods Railway Station to Contractors' Works.

Specification Item No.....	0 to 52 (including 41 to 49)	53 to 60
Approximate maximum weight of rope accommodated (per reel)	2 cwt.	8 cwt.
Price charged to Consignee.....	10/-	15 -
Rebate allowed to Contractor for Reels returned in satisfactory condition, carriage paid, to Ministry Store or Depot from which same were issued	5/-	7/6

MONTHLY MARKET PRICE LIST.

April 5th, 1918.

The prices given below are the prices ruling on the above date.
Terms.—Usual for the various materials mentioned.
Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.*

Ingot	£225 per ton.
Remelted	£210 per ton.

Brass.

Sheets	15¼d. per lb.
Strip	14¼d. per lb.
Wire	14⅝d. per lb.
Tubes	16½d. per lb.
Castings	16d. per lb.
Turning Rod	13½d. per lb.
Brazed Tubes	19½d. per lb.

Copper.

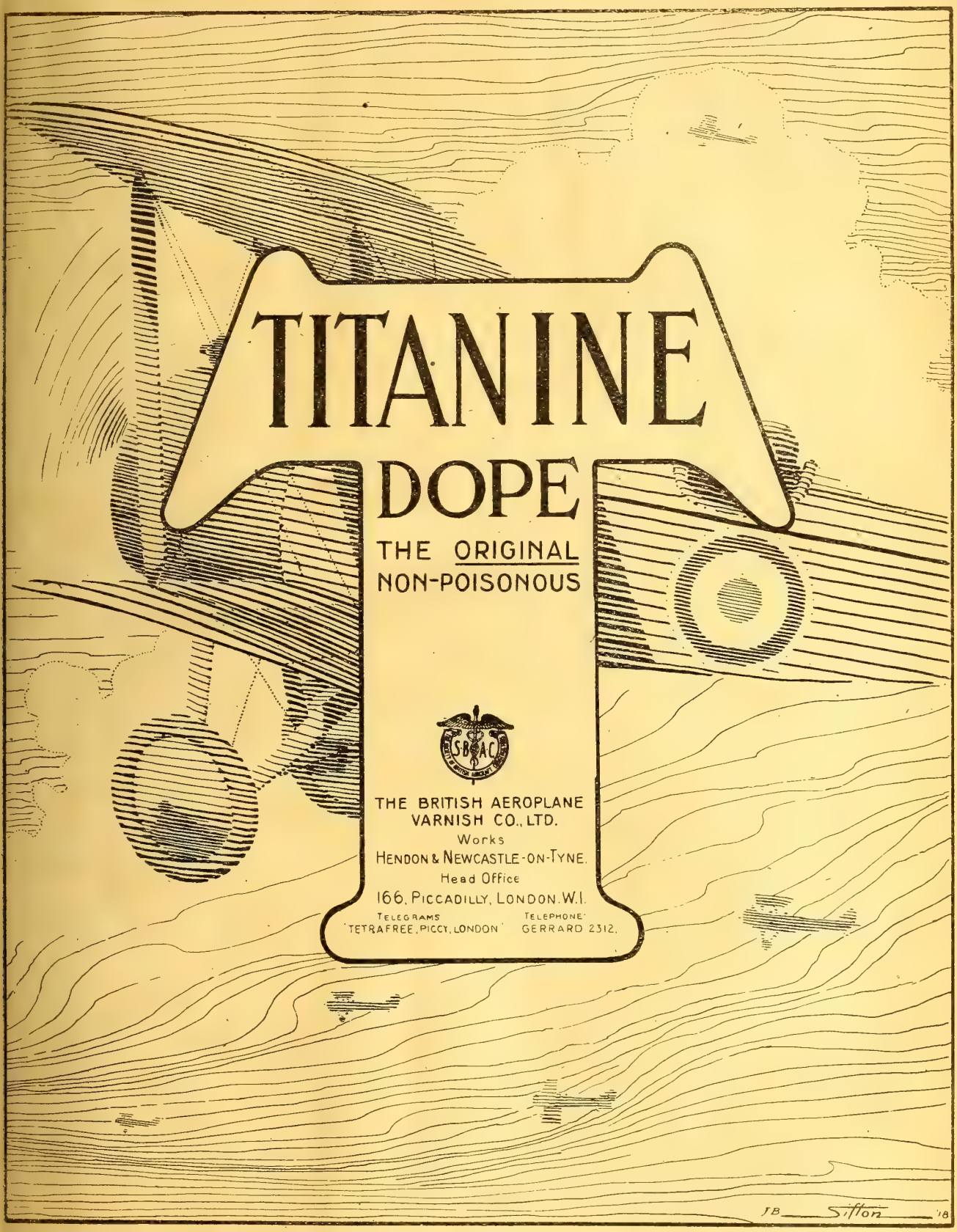
Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (net)	£123 to £119 per ton.
Sheets	£149 per ton.
Wire	15½d. per lb.
Tubes, S.D.	19d. per lb.
Tubes, Brazed	19d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.

Fabric.*

Linen, R.A.F., 17C, Spec., 36 in. wide, 3s. 1d. p. yd.
Linen, R.A.F., 17C, Spec., 38 in. wide, awaiting revision.
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 2s. 1d. p. yd.

A TABLE SHOWING THE PHYSICAL PROPERTIES OF VARIOUS TIMBERS.

Common and Botanical Names.	*Specific gravity based on volume and weight when oven-dry.* Average.	Minimum permitted.	Weight at 15% moisture.	*Shrinkage from green to oven-dry condition.* Radial.	Tangential.	*Static bending.* Fibre stress at elastic limit.	Modulus of Rupture.	Modulus of Elasticity.	Work to max. load.	*Compression parallel to grain.* Max. crushing strength.	*Compression perpendicular to grain.* Fibre stress at elastic limit.	Shearing strength parallel to grain.	*Hardness side.* Load required to imbed 0.444 inch ball to ½ its diameter.
Hardwoods.			Lbs. per cubic ft.	%	%	Lbs. per sq. inch.		1,000 lbs. per sq. in.	Inch lbs. per cu. in.	Lbs. per square inch.			Lbs.
Ash, commercial white (*Fraxinus americana, Fraxinus lanceolata, Fraxinus quadrangulata*)	.62	.56	40	4.5	7.1	7,700	12,700	1,500	14.2	6,000	1,300	1,750	1,500
Ash, black (*Fraxinus nigra*)	.53	.48	35	5.0	7.8	5,800	10,500	1,400	14.1	4,900	800	1,350	740
Basswood (*Tilia americana*)	.40	.36	25	6.6	9.3	4,700	7,200	1,300	6.4	3,800	400	880	340
Beech (*Fagus atropunicea*)	.66	.60	41	4.8	10.6	7,400	12,600	1,500	13.3	5,900	1,100	1,700	1,060
Birch (*Betula lutea, lenta*)	.67	.61	43	7.0	8.5	8,400	13,500	1,800	17.6	6,600	1,000	1,620	1,070
Cherry, black (*Prunus scrotina*)	.53	.48	35	3.7	7.1	7,300	10,600	1,400	12.0	5,800	700	1,500	880
Cottonwood (*Populus deltoides*)	.43	.39	28	3.9	9.2	4,500	7,000	1,200	7.3	3,800	400	800	380
Elm, rock (*Ulmus racemosa*)	.66	.60	44	4.8	8.1	6,700	12,500	1,400	19.3	5,800	1,200	1,650	1,200
Gum, red (*Liquidambar styracinua*)	.53	.48	34	5.2	9.9	6,700	10,400	1,400	11.0	4,900	700	1,500	650
Hickory (true hickories) (*Hicoria glabra, laciniosa, alba, ovata*)	.81	.73	50	7.3	11.4	8,900	16,300	1,900	28.0	7,300	1,800	1,800	—
Mahogany (true) (*Swietenia mahagoni*)	.54	.50	36	3.5	4.2	7,000	10,000	1,300	9.1	5,500	1,000	1,420	800
Mahogany, African (*Khaya senegalensis*)	.50	.46	34	4.8	5.5	7,100	10,400	1,400	10.3	5,100	900	1,270	730
Maple, hard (*Acer saccharum*)	.66	.60	42	4.8	9.2	8,100	12,900	1,600	12.9	6,500	1,200	1,990	1,200
Oak, commercial white (*Quercus alba, macrocarpa, minor, michauxii*)	.72	.65	46	5.3	9.2	6,700	12,000	1,400	12.7	5,900	1,300	1,760	1,270
Poplar, yellow (*Liriodendron tulipifera*)	.42	.38	28	4.1	6.9	4,800	7,500	1,300	6.2	4,100	400	900	370
Walnut, black (*Juglans nigra*)	.56	.52	38	5.2	7.1	7,900	11,900	1,500	13.1	6,100	1,000	1,300	950
Conifers.													
Cedar, incense (*Libocedrus decurrens*)	.36	.32	26	3.3	3.7	4,900	7,100	1,000	6.0	4,300	600	850	430
Cedar, Port Orford (*Chamaecyparis lawsoniana*)	.47	.42	31	5.2	8.1	6,200	10,300	1,700	9.7	5,300	700	1,160	580
Cedar, western red (*Thuja plicata*)	.34	.31	23	2.5	5.1	4,200	6,400	1,000	5.5	4,000	400	790	300
Cedar, white (northern) (*Thuja occidentalis*)	.32	.29	22	2.1	4.9	4,200	5,800	750	5.1	3,400	350	800	300
Douglas fir (*Pseudotsuga taxifolia*)	.52	.47	34	5.0	7.9	6,800	9,700	1,780	7.2	6,000	750	1,020	580
Pine, sugar (*Pinus lambertiana*)	.39	.36	27	2.9	5.6	5,300	7,400	1,100	5.0	4,300	540	950	410
Pine, western white (*Pinus monticola*)	.45	.40	29	4.1	7.4	5,100	7,800	1,400	6.9	4,800	480	670	360
Pine, white (*Pinus strobus*)	.39	.36	27	2.2	5.9	5,100	7,400	1,200	6.1	4,500	530	850	380
Pine, Norway (*Pinus resinosa*)	.51	.46	33	4.6	7.2	7,900	10,900	1,700	6.1	6,100	720	1,150	540
Spruce, red, white, Sitka (*Picea rubens, canadensis, sitchensis*)	.41	.36	27	3.9	7.5	5,100	7,900	1,300	7.4	4,300	500	920	430
Cypress, bald (*Taxodium distichum*)	.47	.42	31	3.8	6.0	6,100	8,800	1,300	6.8	5,400	670	940	460


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
Works
HENDON & NEWCASTLE-ON-TYNE.
Head Office
166, PICCADILLY, LONDON. W.1.
TELEGRAMS
TETRAFREE, PICCY, LONDON
TELEPHONE
GERRARD 2312.
JB Sifton '18

GUN METAL.

Castings .....1s. 8d. per lb.

LEAD.*

Virgin Pig .....£29 per ton, c.i.f.
Virgin Pig .....£30 per ton, ex stores
Sheets .....£39 10s. per ton, D/d
Pipes .....£40 per ton.
Dry White .....£46 10s. per ton, less 5 per cent.
White in Oil .....£53 per ton
(lots over 5 cwt. less 5 per cent.)
White in Oil .....£55 per ton.
(lots under 5 cwt. less 5 per cent.)
Red in Oil .....£42 per ton, less 2½ per cent.

NICKEL.*

Nickel .....£220 per ton.

PHOSPHOR BRONZE.

Ingots, 5 cwt. and under .....£156 to £178 per ton.
(Subject to Copper and Tin Fluctuations.)
Castings .....1s. 8d. to 2s. per lb.

PHOSPHOR COPPER.

Ton lots .....£200 to £205 per ton.

SILVER.

Silver .....45⅝d. per oz.

SOLDER.

Plumber's ..... 133s.
Tinman's ..... 183s.

STEEL.*

High Speed, 14 p. cent., Tungsten, 2s. 10d. p. lb., basis.
High Speed, 18 p. cent., Tungsten, 3s. 10d. p. lb., basis.

ALLOY STEELS TO AIR BOARD SPECIFICATIONS.†

Round and Square :—

Specification No. S2 .....£86
Specification No. S2 (bright-drawn) £115
Specification No. S8 .....£86
Specification No. S10 .....£70
Specification No. S12 .....£75
Specification No. S14 .....£43
Specification No. S15 .....£70
Specification No. S16 .....£70
Specification No. S17 .....£75
Specification No. S18 (oil-hardened) £86
Specification No. K1 .....£75
Specification No. K2 .....£75
Specification No. K3 .....£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710.
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn), £112		£112
Specification S8 (bright-drawn), £112		£112

SPELTER.

English f.o.b., Birmingham .....£54-£50

TIN.

Tin £319

TINPLATES.*

Tinplate .....30s., basis, f.o.t.

TIMBER.

	Official.	Merchants.
Silver Spruce,	10s. 4d.	18s. c.f.
English Ash	As per Official Schedule.	
Cypress	10s. 4d.	12s. 6d.
Mahogany,	1s. 6d. to 1s. 10d.	2s. 2d. to 2s. 6d. s.f.
Walnut,	2s. to 2s. 3d.	2s. 3d. to 2s. 6d. s.f.

ZINC.

Zinc Sheets (American).....£100, f.o.b., New York.

SCRAP MATERIALS (LONDON PRICES).

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing below 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0
Brass, Heavy Selected	£84
Copper, Clean	102
Copper, Brazery	80
Gun-metal, Scrap	122
Lead, no Draft	21
Zinc, Old	42

*Official Prices.
†Prices include Delivery in the U.K.

LEGISLATION PENDING CONCERNING PATENTS AND TRADE MARKS.

The President of the Board of Trade received recently a large and important deputation, organised by the London Chamber of Commerce, representative of the principal Chambers of Commerce of the country, the Federation of British Industries, the London and Eastern Associations of Controlled Firms, the Institution of Electrical Engineers, the Chemical Industries, the Newspaper Proprietors' Associations, and others, for the purpose of making representations concerning the new Bills to amend the Patents and Designs Act, 1907, and the Trade Marks Act of 1905, which were introduced in the last session of Parliament.

Sir George Croydon Marks, in introducing the deputation, said they were of opinion that the position of patentees had not been fully appreciated by those who had drafted the Bills. The proposals in reference to the trade-marks had created alarm, not only in this country, but in America, where it was felt that the sweeping reforms proposed would amount to almost confiscation of the established rights and interests that had been built up in this country in accordance with the provisions and the safeguards of the existing legislation, under which it was believed that the heavy expenditure incurred would be protected for the interests of those who had created the industries associated with the trade-marks in question.

The President, in reply, said the measures introduced were in the nature of "war-time" measures, and were designed solely for the protection and betterment of the industries, and without the slightest intention of hampering or restricting trade or commerce. Abuses had crept up in the past that our enemies had been most assiduous to take advantage of. For example, they had endeavoured to build up by the use of trade-marks as the names of different products perpetual monopolies that would prevent any person or any trader in this country from being able to supply those products. Thus, while if a patent were granted there would be but a limited monopoly for fourteen years, when the process would become public property; yet by the astute coining of words to describe a product that which was in effect created was a perpetual monopoly.

In reference to a suggestion that had been made for the introducing of a short non-contentious Bill to extend the life of patents for the period of the war, sometimes that which appeared a non-contentious Bill provoked a great deal of opposition, and he thought there would be no greater difficulty in carrying through legislation to bring about all the desired reforms in connection with our patent procedure than in carrying through a Bill dealing with only a portion, namely, the difficulties which had arisen in regard to the lapsing of patents that could not be worked during the war. All classes of the community suffered and had to make sacrifices, and it would be impossible to place inventors and patentees, however important their inventions might be, in a privileged position. Provision had been made in the Bill for extending the life of all patents, and special provisions for extension were proposed when it could be shown that direct losses had resulted due to the war, while a corresponding benefit had been given to the nation in connection with the industries at the expense of the patentee. He did not wish to indicate the character of the amendments that might be entertained, but he wished the deputation to clearly understand that the one object in view of his department was to assist the industries and to develop the resources of the country.

Sir George Croydon Marks, in thanking the President, assured him that the deputation highly appreciated the sympathetic manner in which he had listened to their views and the hint that had been given concerning the possibility of amendments that could be introduced to the existing Bills.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

Firth's Aircraft Steels.

Mark "A" Non-Magnetic
Bullet-proof Plates
For Armouring Aircraft.

Thos. Firth & Sons Ld.,
Sheffield.

PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane from the current Official Patents Records :—

Patent Applications.

Allen, R. Gun mountings for aircraft. No. 5498. March 28th.
Armstrong, Whitworth & Co., Sir W. G. Covers for holes in fabrics of airships. No. 5393. March 27th.
Athawes, F. A. Aeroplane trapper. No. 5177. March 23rd.
Bairstow, W. Struts for aeroplanes, etc. No. 5547. March 30th.
Barnholdt, C. F. Control of aeroplane engines, etc. No. 4991. March 21st.
Brereton, H. T. Aeroplane clinometer. No. 5022. March 21st.
Bridger, D. H. Engines for aeroplanes, etc. No. 5101. March 21st.
Brook, C. F. Clinometer for aircraft, etc. No. 4799. March 19th.
Calthrop, E. R. Parachutes. No. 5247. March 25th.
Calthrop, E. R. Parachutes. No. 5248. March 25th.
Chamier, F. W. Airships. No. 5499. March 28th.
Clark, L. F. Automatic level for aerial machines. No. 5214. March 25th.
Cook, C. W. Aeroplanes, etc. No. 5077. March 22nd.
Dawson & Co., J. Building up wood structures, such as ailerons, etc. No. 5295. March 26th.
Dawson & Co., J. Building up planes of aeroplanes, etc. No. 5566. March 30th.
Done, J. S. Appliance for lifting and moving aeroplane cases, etc. No. 5068. March 22nd.
France, A. G. Turnbuckle or wirestraining device for aeroplane wires, etc. No. 4901. March 20th.
Gow, J. J. Waterproofing-solution for aeroplane wings, etc. No. 4957. March 20th.
Gow, J. J. Waterproofing-solution for aeroplane wings, etc. No. 4958. March 20th.
Healey, A. E. Device for detecting and locating sounds of aircraft, etc. No. 5295. March 26th.
Hyatt, N. L. Aeroplane propelling-devices. No. 4849. March 19th.
Jensen, C. A. A. Means for directing airmen. No. 4871. March 19th.
Kennedy, C. J. H. Mackenzie-. Holding and releasing means for use in aircraft. No. 5165. March 23rd.
Kennedy, C. J. H. Power plant for aircraft, etc. No. 5321. March 26th.
Kitchen, J. G. A. Aircraft. No. 5370. March 27th.
Lee, W. Device for indicating inclination of aircraft, etc. No. 4980. March 21st.
Lenton, H. H. Clinometers for aircraft. No. 5389. March 27th.
Lenton, H. H. Instrument for determining relative positions of aeroplanes. No. 5390. March 27th.
Lewis, F. J. Aeroplane and motor-car combination. No 4881. March 20th.
Lloyd, H. M. Aeroplane propelling-device. No 4849. March 19th.
Lock, W. H. Planes and ailerons for aeroplanes, etc. No. 5134. March 23rd.
Macfie, R. F. Apparatus for indicating land speed and angle of drift on aircraft, acting also as a bomb sight. No. 4823. March 19th.
Miller, R. Sight for aerial guns. No. 5172. March 23rd.
Mooney, D. J. Aircraft. No. 5012. March 21st.
Nieuport & General Aircraft Co. Applying dope, etc., to surfaces of part of aircraft. No. 5471. March 28th.
Page, F. H. Aircraft. No. 4732. March 18th.
Parnall, G. G. Internal-combustion turbine engine for aircraft, etc. No. 4974. March 21st.
Pearce, P. M. Wood splice for aircraft. No. 4912. March 20th.
Roberts, C. R. Aero-engine. No. 5269. March 26th.
Roe, A. V. Strainers or turnbuckles for tie-rods, etc. No. 4927. March 20th.
Sabel, W. J. Means for indicating inclination of flying-machines, etc. No. 5438. March 28th.
Schurr, A. E. Petrol, etc., tanks for aeroplanes, etc. No. 5263. March 28th.
Shute, W. O. Device for detecting and locating sound of unseen aircraft, etc. No. 5295. March 26th.
Smith, R. Clinometer for aircraft, etc. No. 4906. March 20th.
Smith, R. A. Means for stabilizing balloons towed by vessels at sea. No. 4967. March 21st.
Sopwith Aviation Co. Clinometers. No. 5481. March 28th.
Taylor, W. T. P. Instrument for locating aircraft by day or by night. No. 5124. March 23rd.
Thomas, G. H. Means for continuously indicating relative position of aircraft to vertical. No. 5297. March 26th.
Thomas, G. H. Internal-combustion engines for aircraft. No. 5305. March 26th.
Williams, G. Level indicator for flying-machines, etc. No. 4898. March 20th.
Williamson, J. W. Heel indicators for aeroplanes. No. 5374. March 27th.
Wirtz, L. Manufacture of propellers for aircraft. No. 4737. March 18th.

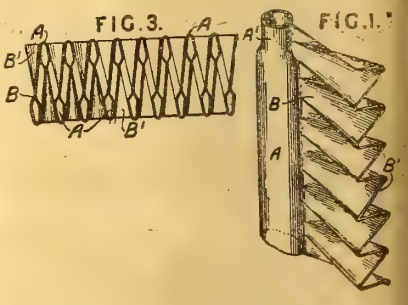
Complete Specifications Accepted, prints of which can be obtained on and after April 11th, 1918.

113,979. Oct. 16th, 1916. Emmons, R. A. Aeroplanes.
103,646. Dec. 28th, 1916. Beld, C. M. B. van den. Sighting-devices for anti-aircraft guns.
114,057. April 14th, 1917. Lowes, T. T. Aeroplanes.

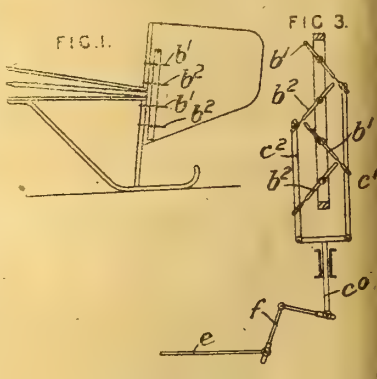
Abridgments of recently published Specifications.

112,666. Radiators for Internal-combustion Engines. Lamplough, H., The Old Tan House, Bray-on-Thames, Berkshire.

A gilled tube A for use in the radiators of internal-combustion engines is formed from a metal strip bent along its longitudinal axis and with its edges united to form a longitudinal gill B. The tube A is of wedge shape, as shown in section in Fig 3, and is formed by pressing the strip around a mandrel. The gill B is corrugated by means of dies and is soldered along its edge, the corrugations being deep at the outer edge B^1 of the gill and gradually becoming shallower towards the tube. The tubes have circular necks A^1 for securing to end-plates, and are assembled in a double row with the gills of each row projecting towards the other row, the gills thus forming a spacing means between the tubes. The gills of one row may be soldered to the tubes of the other row by dipping or otherwise.



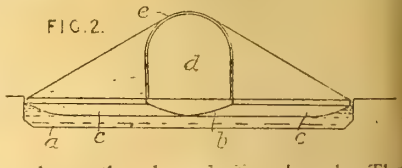
112,775. Aeronautics. Maiche, C., 19, Rue Auguste-Beau, Courbevoie, Seine, France. Jan. 2nd, 1918, No. 122. Convention date, Jan. 26th, 1916. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act.



Planes, Arrangement of; Stopping Way; Parachutes.—A braking device for aerial machines comprises a series of planes arranged behind the centre of gravity and adapted for use also to counteract the sinking of the nose of the machine or, as in the case of a nose-dive, to have a parachute action. Fig. 1 shows a series of planes b^1, b^2 arranged behind the tail plane and serving as auxiliary supporting-planes, but capable of being adjusted to the position shown in Fig. 3 to act as a brake. The planes are adjusted in pairs in opposite directions by means of bars c^1, c^2 actuated by connexions c^3, f, e.

112,806. Aircraft Sheds. Little, J. R., Morden, Duddingston Road, Portobello, Scotland.

A movable floating shed for aircraft consists of two pontoons b, c at right-angles, the main-pontoon b forming the base or floor of the shed and carrying a superstructure e which has a sliding, hinged, or other door d at each end. The pontoons float in a reinforced-concrete tank a, and wheels or rollers may be fitted to their ends. The whole shed and pontoons may be turned by capstans and cables, and a wind vane or sail may be provided on one side of the shed.



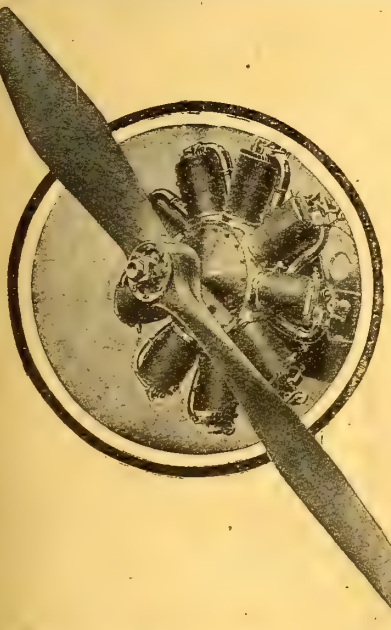
A CHANGE OF ADDRESS.

On account of the increased demand for workshop and practical training for service requirements, the Motor Training Institute, Ltd., have transferred the whole of their instruction to increased accommodation at their works and garage, 21A, Loudoun Road, St. John's Wood (five minutes from Marlborough Road Station), which will in future be the registered address of the company, and to which address all communications should be sent.



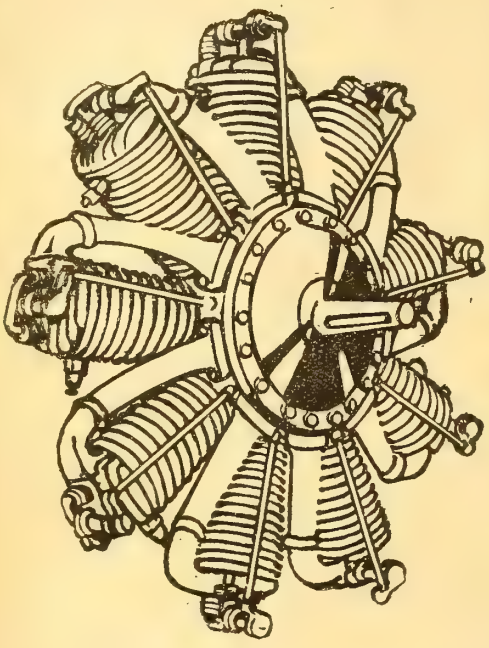
ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.



AERO ENGINES

W. H. ALLEN, SON & CO. LTD.
QUEEN'S ENGINEERING WORKS, BEDFORD,
ENGLAND.



F. W. BERWICK & Co., Ltd.

AEROPLANE & AERO ENGINE MANUFACTURERS TO THE AIR COUNCIL.

PARK ROYAL :: LONDON, N.W. 10.

Telephone: Willesden 2490 (5 lines). Telegrams: "Berworks, Harles, London."

Proprietors and Manufacturers of Sizaire-Berwick Cars.

GWYNNES

LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE,

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

"GWYNNE, LONDON."

AIRCRAFT FINANCE

CURRENT TOPICS.

ROLLS-ROYCE, LTD.

The meeting of Rolls-Royce, Ltd., was held at Derby on March 22nd. Mr. Ernest Claremont (the chairman of the company) presided, and in moving the adoption of the report and accounts, he said: The date of this meeting is later than that of last year, when we had to hold our meeting without having the accounts before us. It will be necessary later, when the accounts are ready, to hold another meeting. We are fortunate, however, in being able to foresee that the profits will not be less than last year, and to so conclude that the same dividend can be safely declared. Beyond that I am quite unable to say what the profits will be. So far during the war our profits have been small, compared with peace time, and we have had no excess profits to pay. The delay in completing the balance-sheet is due to our inability to fix the values of buildings and plant, provided solely for the purpose of the war.

The Share Bonus.

Apart from the cash dividend, the directors are recommending the distribution of bonus shares, "share for share." That is to say, for every share you now hold you will receive another. Such distribution is, of course, subject to the approval of the Treasury. You will understand that the distributing of these shares has merely the effect of declaring that the various reserves which have been created in past years will now irrevocably be retained in the business.

No Amalgamation Contemplated.

The increase of the nominal capital of the company, to allow of the creation of the bonus shares, amounts to £200,000, and as our capital to-day is £200,000, the figure in future would be exactly doubled—i.e., £400,000. As mentioned in the directors' report, the company's energies continue to be fully engaged on the production of munitions of war, and I have no doubt will continue to be so whilst the war lasts. I take much pleasure once more in expressing, on behalf of the Board, their appreciation of the whole-hearted efforts of the company's staff, from Mr. Royce, our engineer-in-chief, and Mr. Claude Johnson, our general managing director, downwards. I have been told by a shareholder that there is a rumour of the company amalgamating with another company, and to prevent any misunderstanding I should like to state that nothing of the kind is in contemplation.

The motion was carried unanimously. A dividend of 10 per cent. in cash was declared, and the proposed distribution of bonus shares was unanimously approved. The retiring directors and the auditors having been re-elected, a vote of thanks to the chairman closed the proceedings.

THE COWPER COLES AIRCRAFT CO., LTD.

Reference has already been made in these columns to the litigation pending in the law courts connected with the disputes which have arisen between the directors of this company, and I have now been favoured with a copy of the transcript notes taken at the hearing in the Chancery Division before Mr. Justice Sargant on March 15th last dealing with the Motions precedent to the trial.

Whilst the voluminous shorthand notes make remarkably interesting reading, the matter, particularly at this stage, has not sufficient general public interest to warrant being gone into here in any detail. The company is a private one, and the public investor fortunately is not involved. Consequently, for the present, at any rate, one may dismiss the subject, at the same time reflecting that it is a pity that in such a period of trouble the entire energies of the Board are not consecrated to producing aircraft to fight the country's enemies instead of fighting among themselves.

THE BRITISH ALUMINIUM CO., LTD.

The Chairman, presiding at the eighth Ordinary General Meeting of shareholders, in the course of his speech made some remarks of particular interest to the Aircraft industry in his review of post-war trade. After referring to the past year's trading he added:—

The uses to which the metal is being put at the present time, while largely of a destructive character, will considerably extend the field in commercial enterprise after the war. There is no doubt that the enormous strides which have been made in the development of aircraft, both airships and aeroplanes, have, in a sense, been due to the use of aluminium in either pure or alloyed form, and I think there is every likelihood that the metal will play as important a part in future commercial enterprise as it is doing to-day in the war. There is also a large field in connexion with motor-cars, agricultural and commercial vehicles, the chemical and brewing trades, and the electrical industry, particularly for transmission lines, where the metal will prove a strong competitor with copper. There were indications of this trend even before the war, which, of course, has meantime been arrested. It may be interesting to note, in connection with the rapid development of the use of the metal, that the total world's consumption to-day is approximately five times the consumption of ten years ago. This rapid increase in its uses has necessitated extensive developments in its production during recent years, and such developments have been made, or are in contemplation, all over the world. The British Government have recognised that this is a key industry, and that it is essential for the future welfare of this country and its industries that the production should be substantially increased.

Extension of the Works.

We have, as you know, had under construction certain hydraulic works for the provision of additional water supply to a reservoir from another catchment area. The Board of Trade and the Ministry of Munitions have made their own investigations into the matter, and are satisfied that the scheme which the company has put forward will make the most economical use of the power available, and they have signified their approval and promise of support in the application for the necessary powers.

The shareholders have already authorised the application at meetings which were held in January last, and, if the application is successful, the powers should be granted during the present year. The scheme, which is a large one, will take some considerable time to develop, and will involve fairly large capital expenditure. The provision of the necessary capital is a matter which will require most careful consideration, but is not one which calls for decision in the immediate future. It is not contemplated, neither will it be necessary, that the whole amount involved shall be issued at one time, although it will be prudent to make provision so that the capital is available as and when it may be required in the course of the development.

Capital and Labour.

Last year I drew attention to the position the company had acquired since its reorganisation in 1910, and this position has been still further strengthened in the accounts which are now submitted to you.

For some time after the war we shall have a period of inflated costs of production and rationing of raw materials, due largely to the shortage of shipping, and it may be that there will be a period of uncertainty before industry gets into its proper stride in the pursuit of ordinary commercial enterprise. It will be necessary in the national interest that industry shall flourish and progress in order to meet the load of taxation which has been placed upon the country in consequence of the war, and in order to give constant and profitable employment to the men who will be released from the Navy and Army.

I believe that if industry is freed as far as possible, and as quickly as possible, from Government interference and control of its policy, it will rapidly adjust itself to the altered conditions, and will flourish and make progress because of the lessons which have been learned during the war. There is, in my opinion, the basis for a better understanding between Capital and Labour, but that can best be accomplished by heart-to-heart talks between the parties involved, without the necessity of Government interference.

It is the opinion of all large employers of labour that the men are entitled to better wages than they obtained in pre-war days, in order that they may obtain better food and a higher standard of living. Better housing accommodation and education are national matters which cannot be dealt with by industry as such, but proper schemes providing for development along rational lines will, I feel sure, obtain the hearty support of all industrial companies.

In return for better wages and improved conditions the men must understand that they will have to give a better or increased

output, otherwise these conditions cannot continue, as the product of industry has to be sold in competition with all the other countries of the world.

Its accomplishment means hard work for everybody, as our competitors are all equally well equipped, and in some cases, particularly America, better equipped than we are with such fundamentals as money and machinery.

The future of the aluminium industry is certainly encouraging, although it must have the usual ups and downs of trade. The company will take its place in this development, and its strong resources and sound financial position will materially assist it to this end.

BONUS SHARE ISSUES AND THE TREASURY.

Under the heading of "Capitalising Reserves" the case of companies issuing fully paid shares to its shareholders to represent the accumulation of profits was fully discussed from the points of view of the private interest of the investor, and more particularly pointing out the loss incurred to the national revenue by distributions in such form. The article in question terminated as follows:—"At a time like the present it is indeed difficult to understand why the Treasury gives its sanction to such issues." In these notes details of the project to issue fully paid shares to the shareholders in Rolls-Royce, Ltd., are published.

Since, no doubt owing to the publicity of such comments having been brought to the notice of the responsible officials, it is interesting to note that the Treasury Committee are refusing to sanction such issues on the grounds "that the issue of bonus shares in existing circumstances is not in the public interest."

The question naturally arises as to the probable effect of the Treasury decision upon the market value of the shares of such companies as had announced to the public their intention to allot bonus shares. This, of course, is a side of the question that will not affect nor influence the Government official, but it has its importance nevertheless.

The Government restriction of all such issues is, however, a decided step in the right direction, as it is no secret that there are companies (as well as many firms) who will stop at nothing to evade taxation, more particularly with special regard to excess profits duty.

These bonus share distributions are quite fictitious, for the reason that they bring no new working capital into the company, and consequently cannot be urged as necessary for development or as serving any other legitimate purpose. G.A

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

Adastral, Ltd.—Private Company. Registered March 19th, to carry on the business of manufacturers and dealers in metal aircraft components, and of metal parts for ordnance, ship-building, railway, or other engines, etc. Nominal capital, £5,000 in 4,500 £1 shares and 10,000 1s. shares.

Mackinnon and Thomas, Ltd.—Private Company. Registered March 21st. Capital, £3,000 in £1 shares. Manufacturers of and dealers in animal-drawn and motor vehicles, internal combustion, steam, electrical, gas and other engines, aircraft, motor boats, submarines, torpedoes, motor and other cycles, munitions, tools, etc.

The subscribers (each with one share) are:—
P. W. Moll, 28a, Basinghall Street, E.C.2, accountant.
Lucy Newmark, 110, Greencroft Gardens, N.W.6, accountant's clerk.

The first directors are:—A. E. Thomas (managing director) and D. D. H. O. Mackinnon. Qualification: 100 shares (managing director 200). Registered office: Lorne Gardens, Park Street, Regent's Park, N.8.

Omegar Lamp Works, Ltd.—Private Company. Registered March 22nd. Capital, £2,000 in £1 shares. Manufacturers of and dealers in electric lamps, motor and aircraft accessories, etc. The subscribers (each with one share) are:—
J. A. Scoular, 83, Merton Road, S.W.19.
Mary Scoular, 83, Merton Road, S.W.19.
Margery Scoular, 83, Merton Road, S.W.19.

The first directors are:—J. A. Scoular and Mary Scoular. Qualification, £50.

MORTGAGES AND CHARGES.

Aeroplane and Motor Bodies, Ltd.—Registered March 8th, 1918. Charge for securing all monies due or to become due to the London Provincial and South Western Bank, Ltd., charged on certain contracts.

Grahame-White Aviation Co., Ltd. (formerly Grahame-White, Bleriot and Maxim, Ltd.).—Registered March 16th, 1918. Agreement and Deed of Charge for securing advances not exceeding £320,000 to the Minister of Munitions charged on lands, leasehold properties, factories, sheds, workshops, offices, hangars, warehouses, stores, dwelling houses and other buildings, etc., plant, machinery, fixtures, fittings, etc., and general charge.

Davidson Aviation Co., Ltd.—Registered Feb. 28th, 1918. £15,000 debentures secured by general charge.

Portholme Aircraft Co., Ltd.—Registered March 12th, 1918. Charged on leasehold property in Huntingdon, £18,000.

Whitehead Aircraft (1917), Ltd.—Registered March 15th, 1918. £300,000 debentures, secured by a general charge.

SATISFACTIONS.

Peter Hooker, Ltd., Walthamstow.—Satisfaction filed March 12th, 1918. £775. Registered Nov. 15th, 1915, and £625 registered March 24th, 1916.

COUNTY COURT JUDGMENT.

Registered February 18th, 1918, against The Aeronautical Institute of Great Britain, 3, Arlington Street, Piccadilly, described as Society for Promotion of Aeronautics, for £19 3s. 6d.

ANSWERS TO CORRESPONDENTS.

Inquiries on any subject affecting or relating to Investments, Stocks, Shares and Securities of Aircraft and kindred companies will be answered in these columns (free of charge).

"Miss E. A. P., Suffolk."—You say you have read the articles published on the subject; there is nothing more to add at the moment.

"S. G., Dennistoun."—The income from "royalties" paid to company forming part of the regular trade or business of the company must be included in its profit, and is taxable after allowing for percentage abatements. If, however, the "royalty" is receivable by a private individual not forming part of his regular trade, business, or profession it would not be taxable.

"Prob. Flight Officer, H.S.M.," "Fuselage," "One Wing," "Clericus," "Mdme. la Veuve":—Want of space prevents replies in detail, but all the points raised are dealt with in the articles concerning this issue. G. A.

QUEEN ALEXANDRA'S VISIT.

Queen Alexandra and Princess Victoria spent the afternoon of April 4th in a visit of inspection to the aeroplane works of Messrs. F. W. Berwick and Co., Limited, in the West London area.

They were received on arrival by Mr. F. W. Berwick, managing director, Mr. Alexander Keiller, Mr. James Greig, and Mr. Lionel Goodricke, directors.

In the machine shops processes were seen connected with the drilling out of cylinders for aeroplane engines, and the cutting and grinding of various component parts. Queen Alexandra and the Princess frequently paused in their inspection and talked to the workers. The Royal ladies talked freely with the girl workers, and Queen Alexandra told some of them, as she had told the workers at other factories, how fine she considered the spirit which had prompted them to work through the holidays.

Having witnessed the making of aeroplane parts, the visitors went into a department packed with completed or nearly completed aeroplanes, and saw the method by which the 230 h.p. engines are finally fixed in position.

CURRENT SHARE QUOTATIONS.

April 9th, 1918.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	22/-	23/-
	7% cum. & ptg. "B" pref., (fully paid) ..	22/-	23/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3¾	3⅞
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	42/-	43 -
Austin Motor Co., Ltd.	7% cum. pref. £1...	18 6	19/6
	£1 ordinary	26/-	27/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	63/-	64/- x
	5% cum. "A" pref.	4⅛	4⅜
	6% cum. "B" pref.	20/-	21/-
Boulton & Paul, Ltd., 5% cum. pref. £1		⅞	1
Brown Bros., Ltd., 6% cum. pref. £5...		4½	4⅝
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	34/-	35 -
	7% cum. pref. £1...	23/-	24/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	20/-	21 -
	£1 ordinary	23/-	24/-
Fellows Magneto Co., 8% cum. partip. pref.		19/-	20/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10¼	10¾
	£10 ordinary	19¾	20
Gwynnes, Ltd., 5% cum. pref.		5⅝	¾
Greenwood & Batley, Ltd., £10 ordinary	Ordinary	38/-	39/-
Humber, Ltd., 6% cum. pref. £1		13½	14
	£1 ordinary	15 -	15 6
Napier (D) & Son, Ltd., 7½% cum. pf. £1		20/-	21/-
	£1 ordinary	19/	20/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		34/-	35/-
Rolls Royce, Ltd.. £1 ordinary		19/-	20/-
Rudge Whitworth, Ltd. £1 ordinary ...		72/-	73/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	45/	46/-
	5% cum. pref. £1 ...	28/-	29 -
Sunbeam Motor Car Co., Ltd., £1 ord...		16/	17/-
Straker Squire, Ltd. (1913), £1 ordinary		75/-	76 -
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		22/-	23/-
		28/-	29/-
Triplex Safety Glass, £1 ordinary... ...		27/-	28 -
Vickers, Ltd., 5% pref. stock...		78	82
	5% pref. shares. £1 ...	17/6	18/-
	£1 ordinary	43/-	44/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		18 -	19 - x

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1915).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend

"TRIPLEX" GIVES PERFECT VISION AND ABSOLUTE SAFETY.

IT CANNOT BE SPLINTERED.



"TRIPLEX" IS THE ONLY SAFETY GLASS FOR WINDSCREENS, OBSERVATION PANELS, GOGGLES, etc.

GOGGLES FROM 7/6 PER PAIR.

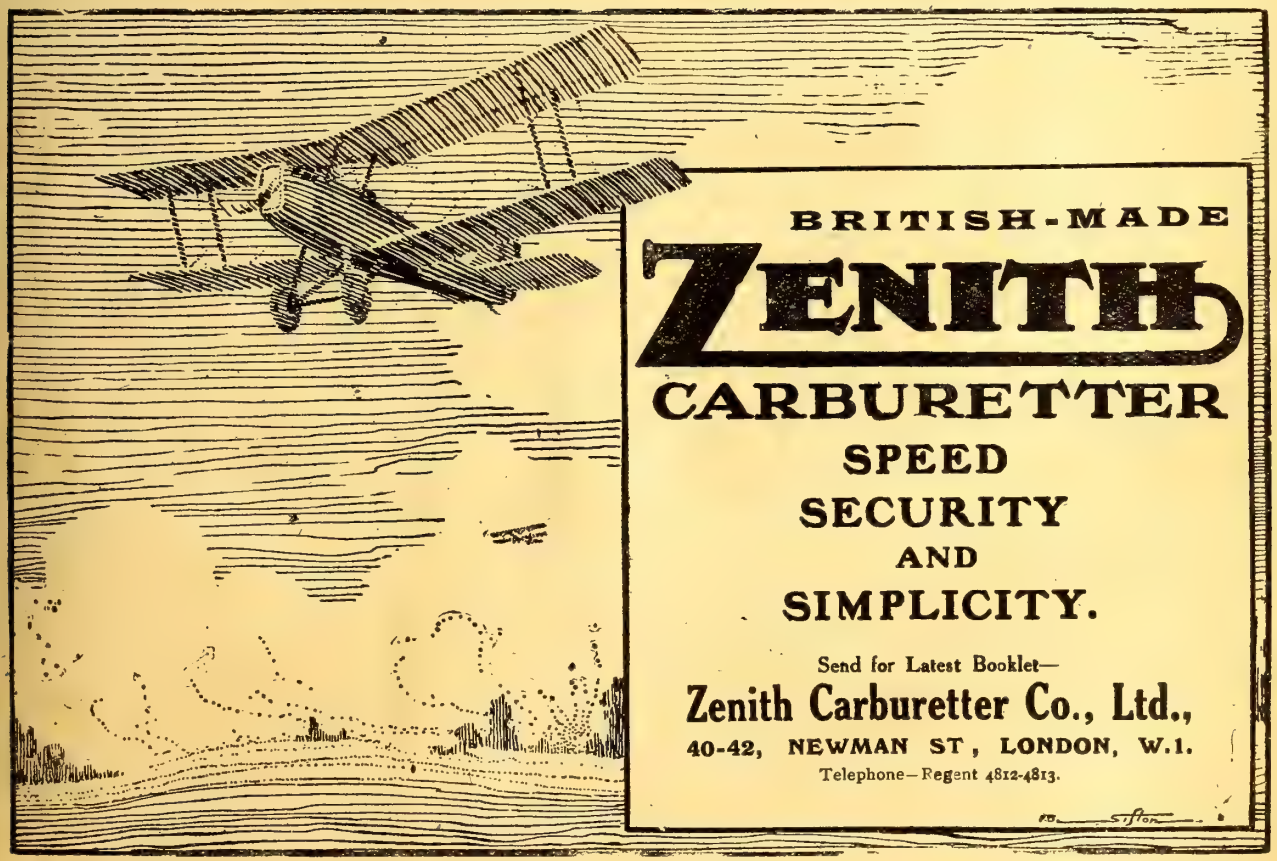
'TRIPLEX' SAFETY GLASS

MANUFACTURED SOLELY BY

THE "TRIPLEX" SAFETY GLASS CO., Ltd. (REGINALD DELPECH, Managing Director,)

1, ALBEMARLE STREET, PICCADILLY, LONDON, W.1.

TEL.—REGENT 1340. Telegrams—"SHATTERLYS, PICCY, LONDON."



BRITISH-MADE

ZENITH

CARBURETTER

SPEED

SECURITY

AND

SIMPLICITY.

Send for Latest Booklet—

Zenith Carburetter Co., Ltd.,

40-42, NEWMAN ST, LONDON, W.1.

Telephone—Regent 4812-4813.



Rotax

ROTAX AEROPLANE FITTINGS and ROTAX MOTOR ACCESSORIES

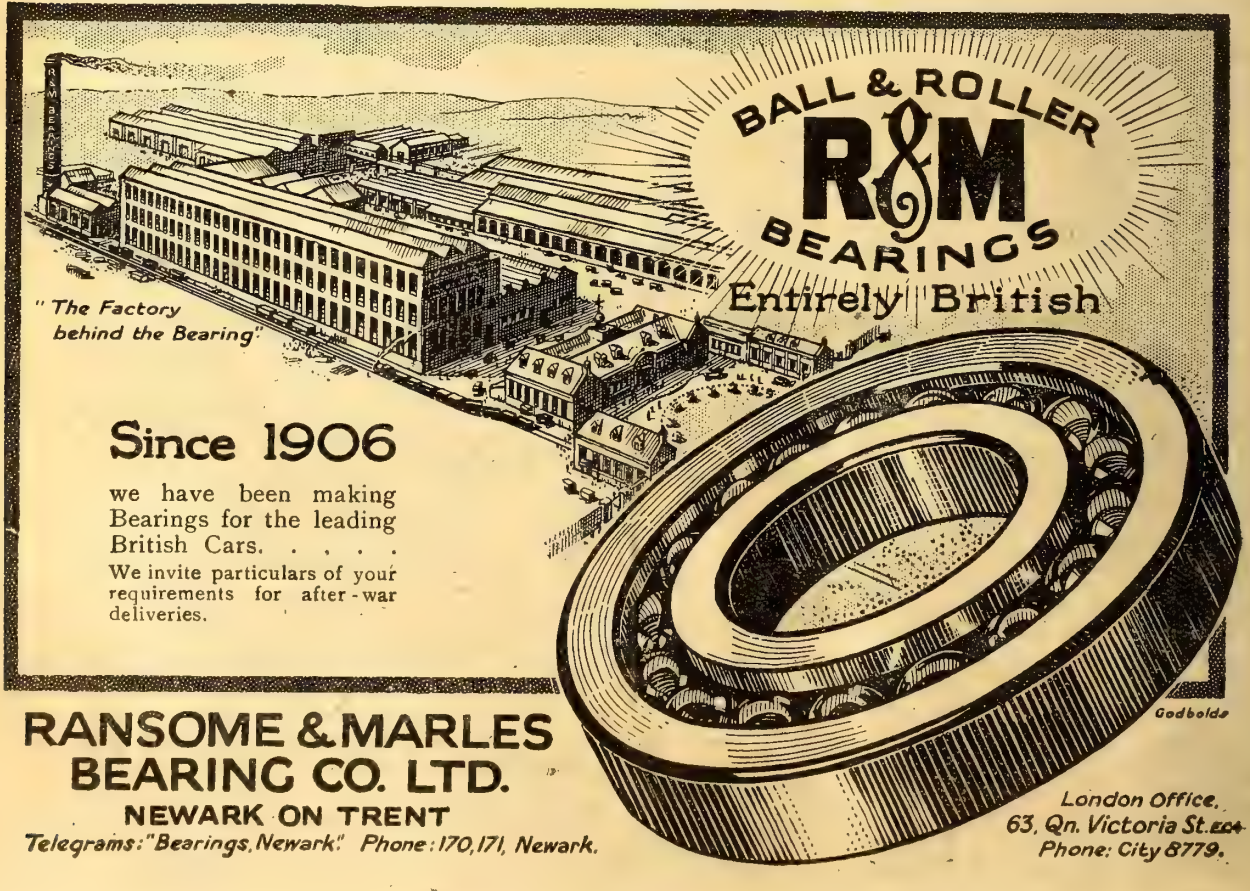
are both made with the same degree of accuracy and reliability that Government requirements call for and service conditions demand.

Special Catalogue of Aero Fittings just published sent on application. Specialities — Electrical Equipment, Streamline Wire and Fittings — Brass and Gunmetal Fittings, etc., etc.

The ROTAX MOTOR ACCESSORIES Co., Ltd.

HEAD OFFICES—

Rotax Works, Willesden Junction, N.W. 10



RANSOME & MARLES BEARING CO. LTD.

NEWARK ON TRENT

Telegrams: "Bearings, Newark." Phone: 170, 171, Newark.

London Office, 63, Qn. Victoria St. E.C.4 Phone: City 8779.

(Continued from page 1330).

Wounded.—Bury, Sec. Lt. N., R.F.C.
Deane, Capt. W., Norf. R., attd. R.F.C.
Ekins, Lt. C. C. F., Essex R., attd. R.F.C.
Howsam, Sec. Lt. G. R., M.C., R.F.C.
Jackson, Sec. Lt. F. T., R.F.C.
Keith, Sec. Lt. F., R.F.C.
Pakenham, Capt. M. M., A.S.C., attd. R.F.C.
Seth-Smith, Sec. Lt. K. A., North'd Fus., attd. R.F.C.

Missing.—Blake, Sec. Lt. H. P., R.F.C.
Butler, Sec. Lt. J. O., R.F.C.
Currie, Lt. J. D., High. L.I., attd. R.F.C.
Dennis, Sec. Lt. E., Sher. For., attd. R.F.C.
Hay, Lt. J. M., Ches. R., attd. R.F.C.
James, Lt. A. R., Yeo., attd. R.F.C.
Kilkelly, Capt. J. G. J., R. Muns. Fus., attd. R.F.C.
Kent-Jones, Sec. Lt. D. W., R.E., attd. R.F.C.
Mealing, Lt. M. E., Shrops. L.I., attd. R.F.C.
Miller, Sec. Lt. C., R.F.C.
Newbury, Sec. Lt. G. G., R.F.C.
Porter, Sec. Lt. W., R.F.A., attd. R.F.C.
Radcliff, Sec. Lt. R. S. F. D., R.F.C.
Thompson, Capt. P., R.F.C.
Tucker, Sec. Lt. D. C., R.F.C.

Canadian Force.—Wounded.—Chisnall, Lt. C. A., Alta. R., attd. R.F.C.
Heakes, Lt. F. V., Cent. Ont. R., attd. R.F.C.
Logan, Lt. T. E., N.S.R., attd. R.F.C.
McLean, Lt. M. S., N.S.R., attd. R.F.C.
Taylor, Capt. N. W., A.S.C., attd. R.F.C.
Wardrope, Lt. W. H. M., Cav., attd. R.F.C.

Missing.—Chant, Lt. E. M., B.C.R., attd. R.F.C.
Martin, Capt. R. H., W. Ont. R., attd. R.F.C.
McCone, Lt. J., Eng., attd. R.F.C.
Reeve, Lt. A., Cent. Ont. R., attd. R.F.C.

Newfoundland Contingent.—Missing.—Edens, Lt. L. A., R. Newf. R., attd. R.F.C.

Reported April 9th.

Killed.—Cotman, Sec. Lt. R. A., R.F.C.

Previously reported Missing, now reported Killed.—Curtis, Sec. Lt. R. L., R.F.C.
Davenport, Sec. Lt. E. S., R.F.C.
Dodd, Sec. Lt. W. de C., R. Muns. Fus., attd. R.F.C.
Erskine, Capt. R., R.F.C.
Field, Capt. A. W., R.F.C.
Halley, Sec. Lt. C. R. B., R.F.C.
Ledger, Sec. Lt. H. P., R.F.C.
March, Sec. Lt. W. F. G., R.F.C.
Maybery, Capt. R. A., M.C., Lancers, attd. R.F.C.
Meredith, Sec. Lt. O. W. W. H., R.F.C.
Orrell, Sec. Lt. J. T., R.F.C.
Randall, Sec. Lt. S. W., R.F.C.
Selous, Capt. F. H. B., M.C., R. W. Surr. R., attd. R.F.C.
Westlake, Sec. Lt. A. N., M.C., N. Staff. R., attd. R.F.C.
Willard, Sec. Lt. K. H., York and Lanc. R., attd. R.F.C.
Wylie, Sec. Lt. A. E., R.F.C.

Wounded.—Barlow, Sec. Lt. T. W., R.F.C.
Clifford, Sec. Lt. A. E. I., R.F.C.
Daggett, Sec. Lt. H. C. E., R.F.C.
Edelsten, Sec. Lt. J., Dorset R., attd. R.F.C.
Elliott, Sec. Lt. G. E. F., R.F.C.
Hanson, Sec. Lt. H., R.F.C.
Jones, Sec. Lt. L. E., R.F.C.
Lewis, Lt. W. R., R.F.C.
March, Sec. Lt. J. G. W., R. War. R. attd. R.F.C.
Mitchell, Sec. Lt. R. G., R.F.C.
Mortimer, Sec. Lt. G. J., R.F.C.
Orr, Lt. D. W., Wilts. R., attd. R.F.C.
Richards, Sec. Lt. R. C., R.F.C.
Richardson, Sec. Lt. H. J., R.F.C.
Savile, Lt. W. A. B., R.F.A., attd. R.F.C.
Smith, Sec. Lt. R. J., R.F.C.

Missing.—Aikins, Sec. Lt. J. R., R.F.C.; Barwell, Capt. H. W. E., M.C., R.F.C.; Cameron, Sec. Lt. D., R.F.C.; Fenn, Sec. Lt. R. P., R.F.C.; Gray, Sec. Lt. W. M. R., R.F.C.; Kirkaldy, Sec. Lt. R. H., R.F.C.; Knox, Sec. Lt. W., R.F.C.; Norman, Sec. Lt. G. R., R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in German Hands.—Urwin, Sec. Lt. T. A., R.F.C.

* * *

Casualties among N.C.Os. and Men.

The Dates are those of the Official List.

Previously Missing, now reported Killed.

March 27th.—R.F.C.: Blatherwick 93629 2nd Cl. Air Mech. C. A. (Stretford); Goss 1391 Cpl. L. S. (Putney, S.W.); Stanley 6717 Serjt. A. O. (Bow, E.).

Died.

March 26th.—R.F.C.: Lindsay P/3173, 3rd Cl. Air Mech., W. (Edinburgh).



A de Havilland Two-Seater Reconnaissance Biplane about to start. The photographer-observer-gunner is seen taking aboard a plate-magazine.

PERSONAL NOTICES.

NAVAL.

Deaths.

DIXON.—Flt. Sub-Lt. H. Dixon, D.S.M., R.N., was killed whilst flying at Ayr, N.B., on April 4th. He was 19 years of age.

GOODWIN.—Flt. Sub-Lt. Godfrey John Whitehouse Goodwin, R.N., who was killed on active service on March 12th, was the eldest son of Mr. and Mrs. John G. Goodwin, Rockside, Matlock, and was born Aug. 1st, 1898.

LOVE.—Flt. Sub-Lt. Harold Ewart Love, R.N., who was killed in an aeroplane accident in the East on March 28th, was the only son of Mr. and Mrs. Alfred James Love, "Forest Dene," 113, Poppleton Road, Leytonstone, E.11. He was 19 years of age.

MALLARD.—Flt. Sub-Lt. Norman Mallard, R.N., was drowned on March 30th whilst flying off the south-east coast. He was the only surviving son of Mrs. Mallard, of Westcroft, Ilkley, Yorks. Educated at Christ's Hospital, he joined the R.N.A.S. last July, on his eighteenth birthday, and was gazetted four months later.

Marriage.

MACLAURIN—GOODALL.—On March 27th, at Bembridge, I.W., Flt. Comdr. Clarence MacLaurin, of Quebec, Canada, was married to Frances Luisa (Pitita) Goodall, only daughter of Mr. and Mrs. J. M. Goodall, The Nest, Bembridge, I.W.

Birth.

ROSS MUNRO.—On March 29th, at 29, Elgin Mansions, the wife of Flt. Sub-Lt. Keith Ross Munro, R.N., youngest son of Mr. and Mrs. William Ross Munro, of Ross Roy, Indooroopilly, Brisbane, Queensland, of a daughter.

MILITARY.

Deaths.

BRICE HALLEY.—Sec. Lt. Clifford Richard Brice Halley, R.F.C., who was previously reported missing on Oct. 2nd, 1917, and is now officially reported killed in action on that date, was the only son of Mrs. Brice Halley, "Nut-Hall," Avenue Road, Crouch End, and of the late James Brice Halley, formerly of 15, Finsbury Circus, E.C. He was 19 years of age.

COLLIER.—Lt. Sidney Collier, M.C., Man. Regt., attd. R.F.C., was the youngest son of the Rev. and Mrs. S. F. Collier, of The Olives, Victoria Park, Manchester, and was killed in France in a fight in the air. He enlisted in Sept., 1914, in the Man. Regt., obtained a commission in Oct. of the same year, went to Egypt in April, 1915, and fought through the Gallipoli campaign, in which he was wounded, and in which he obtained the Military Cross for gallant conduct in the field, and was also twice mentioned in despatches. After the evacuation of Gallipoli he was on the Palestine front for a short time, returning with his regiment to France last year. A few months ago he joined the R.F.C., and after a brief training in England returned to France in March this year. He was 22 years of age.

CURTIS.—Sec. Lt. Ralph Luxmore Curtis, R.F.C., who was reported missing on Sept. 21st, 1917, is now officially reported to have died of wounds on that date, was the eldest son of Mr. and Mrs. W. Curtis, Berwick Ponds, Rainham, Essex.

ERSKINE.—A correspondent writes: "A message has been received by his squadron from the Austrian Flying Corps stating that Capt. Ralph Erskine, R.F.C., who was killed on January 1st last, was buried by them with full military honours at S. Fior di Sopra, four miles N.E. of Conegliano. Capt. Erskine was last seen chasing an enemy 'plane down and close on to its tail. It is not known whether he succeeded in bringing his opponent down; but his own machine was shelled by anti-aircraft guns and crashed out of control."

GORDON.—Capt. Cecil Philip George Gordon, South Staffs. Regt., attd. R.F.C., who was accidentally killed whilst flying at Gloucestershire on March 21st, was the only son of Col. Philip Cecil Harcourt Gordon, Army Medical Corps. He was 24 years of age.

GRANT.—Lt. Eric Duncan Grant, A.F.C., who was killed in a flying accident on April 4th, was the eldest son of the late Alexander Grant, of Melbourne, Victoria, and of Mrs. Alexander Grant, of 249, Cromwell Road, S.W. He was 20 years of age.

HALL.—Capt. D. D. G. Hall, M.C., Yorkshire R. and R.F.C., who died of wounds received while flying on March 26th, was son of Mrs. Upton Gaskell, and was 23 years of age. He had his commission in May, 1915, and was appointed temporary captain in July, 1917.

HOWELLS.—Lt. Edmund Sydney Howells, R.F.C., who was killed accidentally while acting as flying instructor on March 27th, was the eldest son of the Rev. E. Howells, B.D., vicar of Milford Haven. He was educated at the King's School, Worcester, where he represented the school on the river, and was passing from the Sixth Form to Oxford when the war broke out. He received a commission in the Welsh Regiment directly from the O.T.C., and served with it in France, being wounded in 1916. On recovery he returned to his regiment on another front, where he was transferred to the R.F.C., and served for some time in Egypt. Last year he was recalled to act as instructor at home.

HAY.—Lt. Hay, A.F.C., was flying off the Scottish coast on April 7th when his machine fell into the sea and he was drowned.

HUMPHREY.—Sec. Lt. Ernest Graham Humphrey, R.F.C., who died of wounds on March 29th, aged 21, was the son of the late Rev. W. J. Humphrey, formerly principal of Fourah Bay College, Sierra Leone, and of Mrs. Humphrey, of 23, Hereford Road, Acton, W. He was educated at Bedford Modern School, where he gained both entrance and leaving exhibitions. In October, 1914, he entered the City and Guilds (Engineering) College, South Kensington, and passed the intermediate B.Sc. (Engineering) Examination of London University in the following year. He joined the O.T.C. at school, transferred to the Senior Division at Kensington, and in 1915 obtained a commission in the South Staffordshire R. In July, 1916, he was sent to France, and subsequently was attached to the R.F.C. as observer. He had been wounded on two previous occasions.

JONES.—Lt. Cotterell Jones, R.F.C., has been killed through his aeroplane catching fire during a flight. The accident took place in the South of England.

JONES.—Lt. Evan Davies Jones, R.F.C., who was killed on April 2nd, aged 25, was the youngest son of Sir Evan Jones, Bt., of Pentower, Fishguard, Pembrokeshire, and 6, Addison Road, W. He was educated at Haileybury and Trinity College, Cambridge, where he graduated B.A. in 1915, and M.A. in January of this year. He was commissioned in the Royal Fusiliers on Aug. 14th, 1914, and subsequently transferred into the R.F.C., obtaining his pilot's certificate in September, 1917.

KENNEDY.—Capt. Douglas Stewart Kennedy, M.C., R.F.C., who was previously reported missing on March 12th, is now reported killed in action. He was the younger son of Mr. and Mrs. James Kennedy, Chaigmore, Broughty Ferry.

PAGE.—Sec. Lt. Dudley A. Page, Cheshire R. and R.F.C., who was previously reported missing, is now reported as having died of wounds on Aug 14th, 1917, whilst a prisoner of war. He was the younger son of the late Mr. Arthur Page and Mrs. Page, 140, Hill Lane, Southampton.

SPEAR.—Sec. Lt. Spear, R.F.C., a young Scotsman who came to England with the Canadians, was killed while flying in the north-eastern counties on April 1st.

WELCH.—Lt. George Frederick Welch, Indian Army, attd. R.F.C., who was killed on Feb. 11th, 1918, at Lahore Cantonments, Punjab, India, the result of a flying accident, was the only child of the late F. Welch and of Mrs. W. Ferguson Ducat, of Calcutta. He was 26 years of age.

WYATT—SMITH.—Sec. Lt. John Drummond Wyatt-Smith, Gen. List and R.F.C., who was killed on March 17th, aged 19, was the second son of Mr. and Mrs. R. Wyatt-Smith, of Gunton, O.R.C., South Africa, and Church House, Merrow. He was educated at Packwood Haugh and at Sherborne School, where he was a school prefect, head of his house, cadet officer, in the football XV., and captain of the XI. playing at Lord's last summer for the Public Schools. He joined the R.F.C. in August and obtained his "wings" early this year. He had only been a few days at the front.

Engagements.

GLOVER-SUMMERS.—An engagement is announced between Capt. J. W. Thomson Glover, Indian Infantry, attached R.F.C., son of the late David Thomson Glover and Mrs. Thomson Glover, Richmond, Surrey, and Cicely Phyllis, daughter of Mr. and Mrs. F. B. Summers, Froyle Place, Alton, Hants.

HUNT—WEEKS.—The marriage arranged between Lt. Arnold Hunt, R.F.C., son of Mrs. John Hunt, and Nancy Doreen, daughter of the Rev. C. C. Weeks, captain, R.A.M.C., and Mrs. Weeks, and granddaughter of the late Rear-Admiral Weeks, R.N., will take place at St. Hilda's, Crofton Park, on April 27th, at 2.30.

NICHOL-GELLATLY.—The marriage arranged between Capt. Frank Nichol, M.C., Loyal North Lancs. and R.F.C., youngest son of Dr. and Mrs. Nichol, of 1, Ethelbert Crescent, Margate, and Buddie, younger daughter of Mr. and Mrs. Gellatly, of Margate, will take place at St. Paul's Church, Margate, on Saturday, April 20th, at 1.30. No invitations will be sent, but all friends will be welcome at the church.

Marriages.

BISHOP—FREEMAN.—On March 30th, at St. John's, Palmer's Green, Capt. Percy Bishop, M.B.E., R.F.C., youngest son of Mr. and Mrs. Frank Bishop, of Hillingdon, Uxbridge, was married to Dorothy, youngest daughter of Mr. H. Freeman, The Cedars, Winchmore Hill, by the Rev. d'Arcy Preston, M.A.

SCOTT-HERVEY.—On April 2nd, at Selborne Parish Church, Capt. Frank Pilkington Scott, R.F.C., was married to Osyth, youngest daughter of the late William Hervey.

Capt. J. L. Trollope, R.F.C., was reported as missing about March 28th or 29th. Will any relatives of officers reported missing about the above date kindly communicate with Mrs. Howard Trollope, Banstead, Surrey?

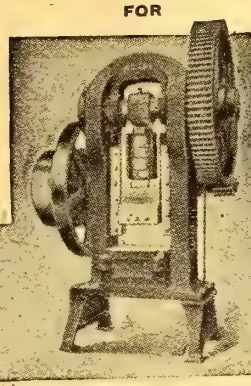
Though it is not customary in this paper to give special publicity to the doings of individual pilots, it seems desirable to

BLISS

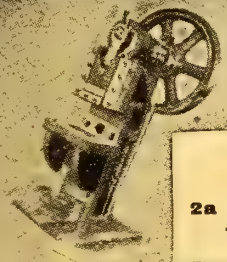
PRESSES & DIES FOR

AEROPLANE STAMPINGS

SEND YOUR STAMPING PROPOSITIONS TO US.



WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.



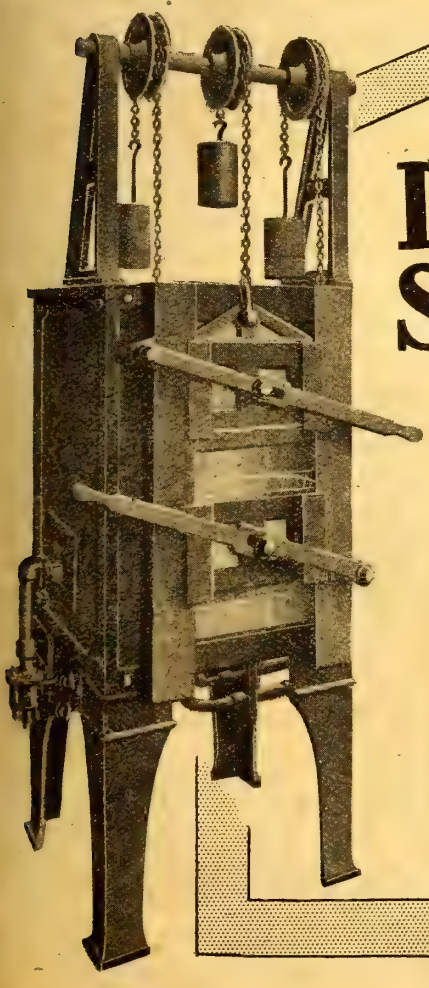


WRITE TO

E. W. BLISS CO.,

2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1

TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."



Davis High-Speed Steel Furnaces

The Davis "D.H.S.T." series of Gas-Fired Furnaces have been specially designed for the hardening of modern High Speed Steel Tools, and to provide the maximum of convenience and efficiency at the least practicable fuel cost.

The fixing element consists of Davis PATENT Air-Blast Burners, for gas at ordinary main pressure and air at 3 lbs. per square inch. Two chambers are provided, each fitted with rise-and-fall door complete with counter-balance gearing and actuating levers. A pre-heating temperature of 1000°C is attainable in the upper chamber, the lower one reaching 1500°C; whilst the flame does not impinge on the work.

Illustration shows the D.H.S.T. 200 Series (working spaces from 11 ins. × 9 ins. × 4½ ins. to 21 ins. × 18 ins. × 9 ins. Prices from **£39** complete. Write for lists F18 A. B. & C. (gratis.)

THE DAVIS FURNACE COMPANY

(Proprietors, The Davis Furnace Co., Ltd.)

Dept. —. THE DIAMOND FOUNDRY, LUTON, BEDS.

publish an account of an exploit by Capt. J. L. Trollope, R.F.C., firstly, because the bringing down of six enemy aeroplanes in a day is in itself a record which one believes, is unequalled by any other pilot in any of the belligerent flying services, and, secondly, because this officer is, unfortunately, reported as missing, and so the publication of his gallantry cannot be regarded as an advertisement. The following account is taken, with due acknowledgments, from the officially approved report of the Special Correspondent of the "Times" newspaper at G.H.Q. :—

"Capt. Trollope was out with a formation when they saw four German fighting aeroplanes trying to interfere with some of our observing machines. Capt. Trollope attacked one of the enemy, and fired into it from close range, when the German aeroplane fell all to bits in the air.

"The other three Germans scattered and got away, so, going on, Trollope soon espied two more enemy two-seaters below him, close to the ground. He dived at them, and engaged them one after another, and both went down and crashed, the fighting being so low that in each case their striking the earth was clearly visible. Capt. Trollope then climbed up to rejoin his formation, which was again engaged with another party of the enemy. He entered the mêlée, and used up what ammunition he had left, and came home for more.

"Having replenished, Trollope started out again, and met a party of three of the enemy trying to cross the battle line. He went for one of them, but his gun jammed, and he had to draw off till his gun got going again. Then he turned and attacked another of the enemy who was nearer than his original antagonist, fired into him at point-blank range, and the enemy went down spinning and then broke into pieces.

"Turning from his last victim, Capt. Trollope then went after the third of the enemy party, caught it up, attacked it, and the German broke into flames in the air. This made five of the enemy shot down in a single day, and Trollope turned for home. But on the way he saw another enemy scout attacking one of our slower machines.

"He went to the rescue, and tackled the enemy, who went down spinning, and the other pilot saw it crash hopelessly into the ground. It was altogether a most brilliant performance, and that so gallant a man should now be missing will be a matter of universal regret."

* * *

Will repatriated officers and men who may have seen Lt. Streather, R.F.C., in Germany, please write to his mother at D'Arcy House, Finchley Road, Golders Green, N.W.?

AIR FORCE.

Deaths.

BURTON and PAYNE.—Lt. Burton, R.A.F., an Australian, and Lt. Payne, R.A.F., came into collision while flying at Montrose on April 4th. Their machines spun to the ground, and both aviators were killed.

CHRISTIE.—The death in hospital is announced of Sec. Lt. David Christie after a flying mishap on the north-east coast.

ENGLAND, HACKMAN, and CRAIGIE.—A triple flying fatality occurred near Chichester on April 7th. Sec. Lt. Norman Herbert England, R.A.F., and Sec. Lt Clifford Hackman, R.A.F., were in a dual control machine, and Sec. Lt. Victor R. Craigie, R.A.F., was in another machine. About 300 feet from the ground the two machines came into collision and fell. When assistance arrived, it was found that Mr. Craigie and Mr. Hackman were dead. Mr. England died on the way to the hospital.

HUGUENIN, SEIFERT, and KRAUTMAN.—On April 3rd, at an aerodrome in Lincolnshire, one machine crashed into another which was stationary on the ground, and Lt. S. Huguenin, an American, recently of Wisconsin, U.S., Corporal B. J. Seifert, and Pte. N. Krautman were killed. A fourth man was badly injured.

MOORE.—Lt. J. G. Moore, who recently arrived from India, was killed in a flying accident on April 2nd at an aerodrome in Lincolnshire.

TUCKER and DUNLOP.—Two young flying officers, Sec. Lt. H. C. Tucker, R.A.F., and Sec. Lt. H. S. A. Dunlop, R.A.F., were killed on April 4th while flying in the East Midlands. Their machine nose-dived and fell. Mr. Tucker was an experienced aviator, and was acting as instructor. Mr. Dunlop came from Scotland.

Engagements.

COOK—DISNEY.—An engagement is announced between Capt. Charles Cook, R.A.F., and Miss Disney, only daughter of Norton Disney, of The Hyde, Essex.

GROVER—PATTERSON.—A marriage has been arranged between Lt. George W. M. Grover, R.A.F., only child of the late George Grover and Mrs. P. Samuelson, and Josephine W. (Joan) Patterson, twin daughter of Mr. and Mrs. W. R. Patterson, of Sorrento Lodge, Ryde, lately of 40, Cleveland Square, Hyde Park, London.

Marriages.

GREEN—ROSKILLY.—On April 2nd, at the Catholic Apostolic Church, Camberwell, Capt. John Spencer Green, M.C., R.A.F., eldest son of Mr. and Mrs. E. S. Green, of Herne Hill, was married to Beatrice Louise, eldest daughter of Mr. and Mrs. E. A. Roskilly, of Forest Hill.

HEBDEN-PHILLIPS—PEARS.—On the 6th inst., at Holy Trinity Church, Tulse Hill, Sec. Lt. Evelyn Henry Hebden-Phillips, R.A.F., second son of Mr. and Mrs. Cornelius Hebden-Phillips, of Dover and Sudbury, Canterbury, was married to Muriel, only daughter of Mr. and Mrs Ernest Pears, 77, Christchurch Road, Tulse Hill, by the Rev. H. Woffindin, M.A., Vicar, assisted by the Rev. F. McConnell, M.A.

LIVINGSTONE—COOPER.—On 2nd inst., at St. John the Evangelist, Edinburgh, Capt. Alexander F. Livingstone, R.A.F., eldest son of the late Frederick Livingstone and Mrs. Livingstone, 33, Queensborough Terrace, Hyde Park, was married to Jeanette Margaret Graham, younger daughter of Alexander H. Cooper, W.S., 54, Manor Place, Edinburgh, and West Glenturret, Perthshire, and the late Mrs. Cooper, by the Rev. Canon Terry.

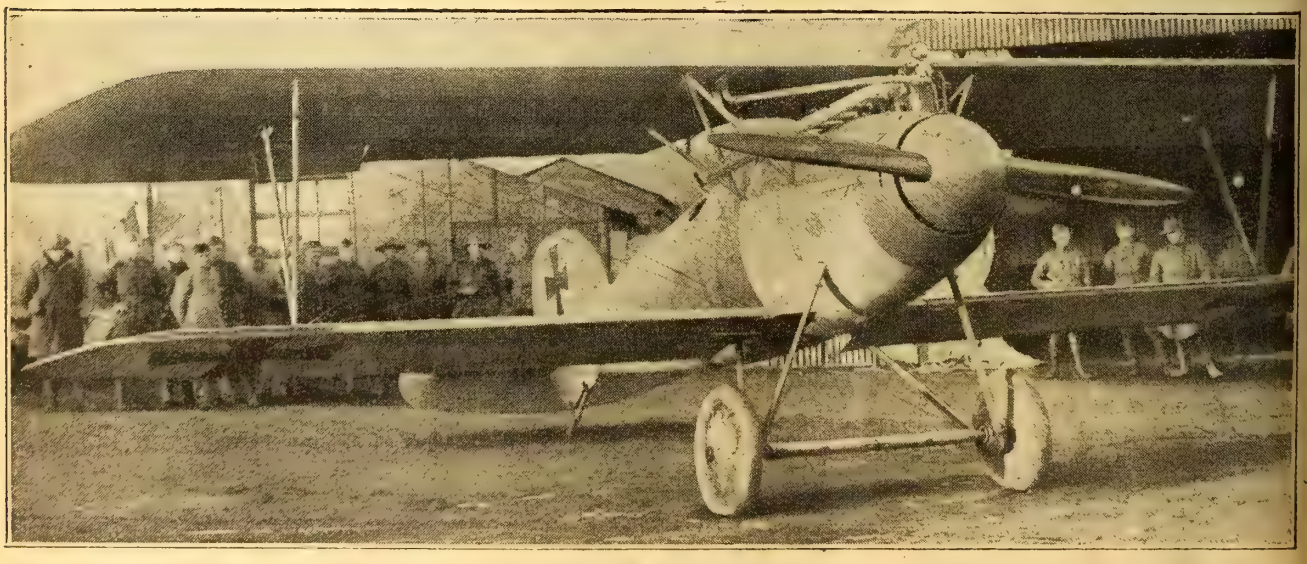
WAIN—FORREST.—On April 4th, at St. George's, Hanover Square, by the Rev. F. Monteath Jackson, R.N., Capt. William Donston Wain, R.A.F., was married to Nesta Sybil, daughter of the late Robert Forrest and Mrs. Forrest, New Court, Marlow, Bucks

FOREIGN COMMUNIQUES.

FRANCE.

Official Communiqués.

April 2nd.—Last night two groups of German aeroplanes crossed our lines flying in the direction of Paris, and were signalled by our watching posts. The alarm was given at 3.3 a.m. Our batteries opened a violent fire against the enemy machines, which were compelled to turn back. Some bombs were dropped in the outskirts, but there were no casualties and



A "V. Strut" Albatros fighting biplane captured by the Royal Air Force.

Contractors to the Admiralty and Air Board.

THE

CENTRAL AIRCRAFT COMPANY

DESIGNERS AND CONSTRUCTORS

OF AIRCRAFT.

Office and Works:

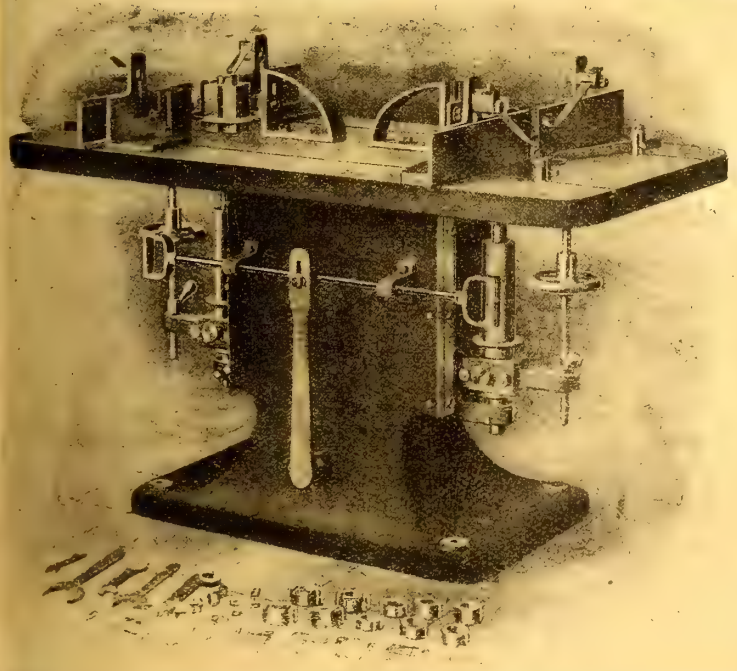
KILBURN, N.W.6.

Telegrams: Aviduction, Phone, London.
Telephone: Hampstead 4403, 4404.

HAIGHS

(OLDHAM) LIMITED

MANUFACTURERS OF ALL KINDS OF WOODWORKING MACHINERY.



D.D. Double-Spindle Circular Moulding Machine

Suitable for many varieties of irregular and circular work required in a Cabinet Maker's, Joiner's, or Builder's Works.

Globe Iron Works,
OLDHAM.

Telegrams: HAIGH, OLDHAM.
Telephone: 1273 Oldham.

Haighs (OLDHAM) LTD.

no serious damage was caused. The "All Clear" signal was given at 4.20 a.m.

April 3rd.—On March 31st and April 1st our squadrons dropped 12,000 kilogrammes (about 12 tons) of explosives on the railway lines and cantonments of Ham, Chauny, Noyon, etc. A great fire broke out at the railway station of Chaulnes.

Enemy cantonments in the region of Roye were plentifully bombarded with machine-guns from a low altitude.

Our avions de chasse fought numerous engagements, in the course of which eight German machines were brought down, while two others were destroyed by means of anti-aircraft guns.

April 4th.—Army of the Orient.—"Allied aviators carried out successful bombing raids, notably on Berat (Albania)."

April 5th.—On April 3rd five enemy aeroplanes were brought down, one of them by our machine-gun fire. In addition a German captive balloon was set on fire by one of our machines. During the night of the 2nd and during the day on the 3rd our bombarding machines made numerous raids. Twenty-three thousand kilogrammes (about 23 tons) of bombs were dropped on enemy cantonments, railway stations, and other establishments. Fires were observed, especially in the railway stations of Laon and St. Quentin.

It is confirmed that five more enemy aeroplanes were destroyed by our pilots on March 27th, 31st, and April 1st, and 2nd.

April 7th.—On April 6th seven German aeroplanes and two captive balloons were brought down by our pilots.

Our bombing machines dropped 5,000 kilogrammes (about five tons) of projectiles on the stations and contonments in the Roye region.

Army of the Orient.—Two tons of explosives were dropped by Allied aviators on enemy establishments.

April 8th.—Army of the Orient.—Enemy cantonments at Demir-Hissar were bombed by British aircraft.

GERMANY.

Official Communiqués.

April 2nd.—Yesterday 22 enemy aeroplanes and five captive balloons were shot down. Lt. Kroll won his 23rd aerial victory.

By the energetic carrying out of long-distance observation from the coast as far as south of the Somme, Aerial Detachment No. 3, under the command of First Lt. Friecke, rendered extraordinary service.

April 3rd.—Rittmeister Baron von Richthofen won his 75th aerial victory.

April 7th.—In aerial battle 18 enemy aeroplanes were yesterday shot down. Rittmeister Baron von Richthofen gained his 76th and Lt. Udet his 24th aerial victory.

April 8th.—Rittmeister Baron von Richthofen achieved 77th and 78th aerial victories.

ITALY.

Official Communiqués.

April 2nd.—Along the whole front the bad weather hinder aerial activity.

April 4th.—Our aviators set fire to an enemy captive ballo in the vicinity of Valdobbiadene (north of Montello). Duri the night they bombarded the railways in the Val Lagarina.

April 5th.—British aviators brought down three ene machines above Cismon (Brenta); a fourth was compelled to la near Strigno (Val Sugana).

TURKEY.

Official Communiqué.

April 4th.—As reprisals for the attacks carried out on Ma 25th by enemy aeroplanes against the open town of Esine, n aeroplanes bombed, during the night of April 1st-2nd, the p establishments in the island of Tenedos.

BULGARIA.

Official Communiqué.

April 5th.—In the Tcherna bend a French aeroplane brought down in an air fight, and fell behind the Bulgar lines.

THE WAR IN REVIEW.

The "Times" correspondent, writing from Paris on April says:—

The battery of 210 mm. (8.4 in.) guns which bombards P consists, or consisted—for one gun has already ceased to exi of at least two, and perhaps four, pieces.

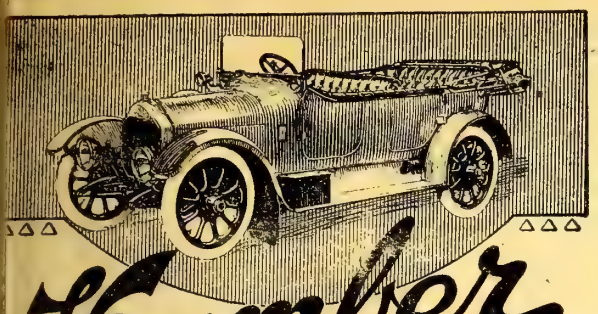
Directly a shot is fired French heavy batteries concentrate the emplacement, while aviators rain bombs on it. M. Cha Nordmann, the astronomer, states in the "Matin" that the which bombarded Paris last week has been move l a distanc a mile and a quarter from its original station. It is now miles from the capital. As these guns are mounted on rails change of position presents no great difficulties.

On the other hand, from the French standpoint, it is extren difficult to spot their position by photographs, because of enemy aeroplanes which hover round. Moreover, the gun last week—"Bertha," as it is called—is eight miles within German lines, and in order to find high ground from whic bombard her the French heavy guns must be placed some t

HIGH-CLASS
ALUMINIUM CASTINGS
FOR ALL TRADES.
We Specialise in Aluminium Cylinders and General Aero and Motor Engine Castings,
CAST IRON CYLINDERS
Water and Air-cooled for Aero & Motor Engi es
ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.
WILLIAM MILLS, LTD.,
Atlas Works :: Grove Street,
BIRMINGHAM.
ALUMINIUM AND IRON FOUNDERS.

SIXTH EDITION, 1918.
DYKE'S AUTO-ENCYCLOPEDIA
THE STANDARD WORK ON MOTOR MECHANIS
Sanction has been given for this Book to be supplied through H.M. Station Office to Schools of Military Aeronautics.
Adopted by the American Government (War Dept.) for use in all t Aviation Schools.
A Thorough, Practical & Simple Treatise on Principle, Construction, Repairs and Troubles—and How to Remedy Them.
THE BOOK for the EXPERT and the STUDEN
Containing upwards of 900 pages. 775 Illustrations on Electrical Subje 1,189 Illustrations on Repairs and Adjustments. 300 Illustrations on "The For 5 Coloured Inserts.
OVER 250,000 COPIES SOLD.
Price £1 : 1 : 0 net, post free, cash with order, from your Bookseller, or direct from the Publisher,
S. G. GILLAM, Dome Building, RICHMOND, SURREY
*** Prospectus on Application.

THE POOLE AVIATION CO.
POOLE, DORSET.
Contractors to H.M. Government.
Spares and all Parts of Machines.
ENQUIRIES INVITED.
'Phone: Poole 54. 'Grams: Aviation, Poole.



Humber

OUR out-put is only suspended "for the duration of the war." The Government work on which we are engaged is of more importance for the time being. But the experience gained in the manufacture of Aircraft engines demanding the highest engineering skill procurable will be invaluable to us in the future—and to you, if you put your name on our waiting list.

HUMBER LIMITED, COVENTRY.

LONDON: 32, Holborn Viaduct, E.C.1.
60-64, Brompton Road, S.W.3.
Repair Works: Canterbury Rd., Kilburn, N.W.6.
SOUTHAMPTON: 25 & 27, London Road.

ACCURACY

to the ten-thousandth part of an inch

WITH EASE

Micrometer and Special Gauges wear quickly and are subject to misuse producing inaccuracies which pass unnoticed, but often lead to disputes between viewers and inspectors.

These difficulties are overcome by the use of The Prestwich Fluid Gauge, which has no wearing parts, and entirely eliminates the sense of touch. The Prestwich Gauge shows immediately if the work is "within the limits," it magnifies an error 1,000 times, thus limits of $\frac{1}{1,000}$" are visible to the eye as 1", and can be noticed by the most unskilled operator.

The Prestwich Fluid Gauge
Accuracy to the ten-thousandth part of an inch with ease

indicates the exact amount of any error and readings may be taken to $\frac{1}{50,000}$ part of an inch, at the rate of 60 per minute if necessary.

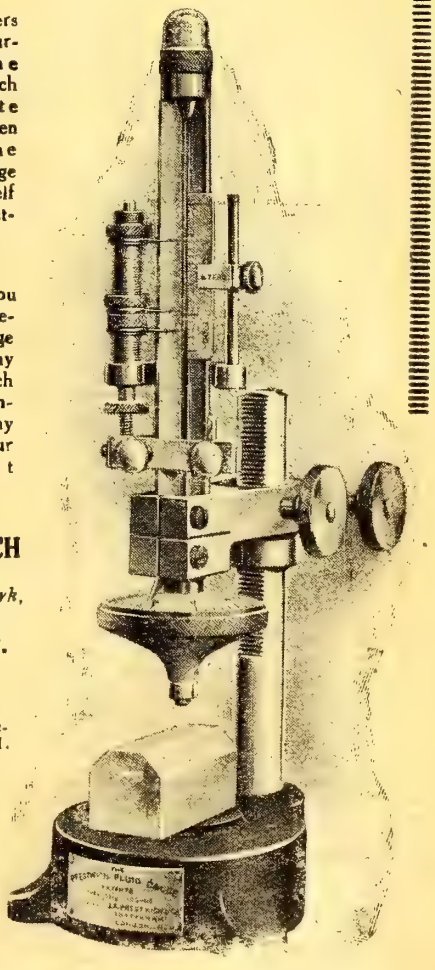
Think what this means when a quantity of work has to be gauged to a standard. Think of the saving in time and money made possible by the use of the Prestwich Gauge in your factory.

Hundreds of users have been surprised at the simplicity to which their intricate gauging has been reduced. The Prestwich Gauge will prove itself a profitable investment for you.

May we send you full particulars regarding the Gauge itself, and the many adaptations which have been constructed? Why not write for our illustrated booklet to-day?

J. A. PRESTWICH & CO.,
Northumberland Park,
Tottenham,
London, N.17.

Agents and Manufacturers for U.S.A. and Canada:—The Coats Machine Tool Co., 30, Church Street, New York.



to four miles in the rear of the French front. It is, therefore, no easy task to silence "Bertha." Gas shells have proved most effective in such work hitherto.

M. Nordmann thinks it probable that a decoy gun is fired simultaneously with the big piece. Needless to add "Bertha's" position is carefully hidden. She lives in a tunnel, and never fires at night, lest the flash might betray her

* * *

A message from Paris, dated April 5th, states that in the recent French raids on Karlsruhe bombs fell on the station, which was severely damaged. Forty persons were killed and about 100 wounded. At Trêves a munition factory was blown up. There were a number of victims and much damage was done.

At Metz-Sablons the French bombs damaged eight locomotives and hit a munition train, which was blown up. A gasometer was also blown up. Several wagons loaded with explosives caught fire, and 50 people were killed.

* * *

Mr. Patrick Devitte, the "Daily Express" correspondent at Geneva, writes on April 5th:—

According to news received at Basle the British air raid on Cologne caused 248 deaths. Half of this number were soldiers who were in the troop train which was damaged by the aviators' bombs. The train was standing in the station waiting to start for the Western Front. The raid caused an indescribable panic, which lasted for 12 hours.

* * *

At a ceremonial presentation of War Medals at the Scala Theatre at Milan recently the High Commissary made his first speech on the matter which he is appointed to manage, to wit the supplies of aeroplanes and the means to use them efficiently for the extinction of the Boche peril.

His Honour said that the dominating force in the air is not that of the enemy on this front. He then told us that a Caproni had bombed Metz. Mentioning the silk scandal, he said according to the papers, that "we still have silk for our wings but the enemy has not."

* * *

A long Rome semi-official of March 23rd, dealing with dirigibles, says in concluding:—

"Altogether between the 11th and 19th of March our dirigibles and those of the Royal Navy dropped about 14 tons of high explosives on exclusively military objectives in zones protected

Bowden

BOWDEN CONTROLS AND BOWDEN CABLES FOR ALL AEROPLANE PURPOSES.

Quotations on application.

Note Address—

The BOWDEN BRAKE Co., Ltd., Tyseley, B'HAM.

Tyseley

AEROPLANE

Do you require Metal Parts for Aeroplane Work? If so, consult us. We can quote for—

Tubes and Tubular Construction Sheet Metal Pressed Parts. Wheel Rims and Special Sections in Steel of any length, gauge or width. Brazing, Acetylene, and Electric Welding, etc.

We can also make any Special Parts to instructions. Consult us NOW.

THE LOMBARD RIM & TUBE CO., Lombard Street, BIRMINGHAM.

PARTS



The Perfect Aero Engine Joint Filler.

L'Hermetic COMPOSITION Makes Perfect Joints

Sample Tin Gratis to Aero Engine Builders

L'Hermetic securely seals joints against penetration by air, water, grease, dirt, and dust. It is heat-proof and insoluble in all spirit, oil and fatty essences.

The French military authorities and all leading French aero engine manufacturers use Hermetic by reason of its thorough efficiency and marked superiority over substitute compositions.

MESTRE & BLATGE

20, STORE ST., LONDON, W.C. 1.

J. W. HAWKES, Manager.

PULVO

Promptness plus Precision; Promise plus Performance; the Possible passing through the Probable into the Positive; these are some of the points that are predominant in the Work produced by PULVO.

That is a short epitome of the Pulvo policy.

We specialise in giving satisfaction.

Any job in small part work; pressed or welded; filed or bent; turned or drilled — that is the job we can do for YOU.

YOU WANT THE BEST WORK— WE DO IT.

The PULVO ENGINEERING Co. Ltd.

10, 12, 14 and 16, DANE STREET, and 95 and 97, HIGH HOLBORN, LONDON, W.C.1.

Telephone: Holborn 410.

Telegrams: Pulvipult, West-Cent.

WAY Alldays

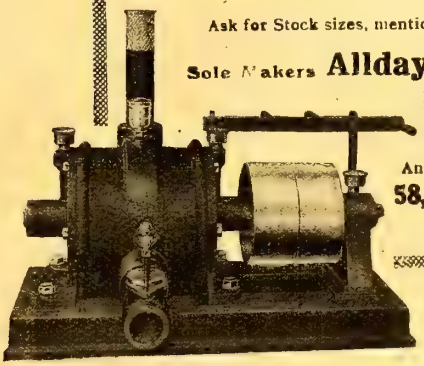
"EMPIRE" Positive Pressure Blower

For use in the construction of Aeroplanes.

This Blower is specially suitable for Gas and Oil Furnaces, Blow Pipes, or any other work requiring a uniform steady pressure.

Simple in construction and positive in action.

Ask for Stock sizes, mentioning Department W.



Sole Makers **Alldays & Onions Pneumatic Engineering Co. Ltd.**
BIRMINGHAM
And at
58, Holborn Viaduct, LONDON.



on a "Belfast Roof" is an ideal covering for Hangars. Any width

UP TO 100 FEET CLEAR SPAN.

Outlasts galvanized iron, more equable temperature.

BRITISH & BEST

Write for Booklet "R."

49

D. ANDERSON & SON, Ltd., Lagan Felt Works, Belfast; and Roach Road Works, Old Ford, London, E.

by noteworthy A. A. forces. This growing activity in face of the growing difficulties of dirigible action (height questions?—T.S.H.) shows the courage, skill and self-sacrifice of the valiant dirigibists and the progress made in the use of airships.

* * *

The conferring of the Gold "for valour" medals on Lt.-Col. Piccio, Maj. Baracca and Capt. the Prince Ruffo di Calabria, by the still convalescent Gen. Rossi, appears to have been a great moment for all present, among whom were the Officer Commanding the French troops of the district, the representative of the Allied Nations, and Maj. R. C. Whitehead, M.C., R.F.C.

* * *

It is reported by the Christiania journal, "Tidens Tegn," that a Zeppelin was lost outside Jæderen, Norway, apparently after having been hit by a British warship.

* * *

A Danish seaplane was lost on April 6th in the Kattegat, and two officers were killed.

* * *

Secretary Daniels, of the U.S. Navy, in a speech at Cleveland, Ohio, said:—

"Aviation bases have been established in Europe, and members of the Naval Flying Corps have been for months in active service. The first of the regular armed forces of the United States landed in France were naval aviators, who arrived on June 8th. Our aviators are co-operating with those of England, France, Italy, and Portugal."

* * *

The "Times" states that Mr. Baker, United States Secretary for War, has accepted the offer of the Eastman Kodak Company, of Rochester, N.Y., to provide without charge temporary accommodation for an army school of aerial photography where a thousand men can be trained every month. It is hoped that 4,000 or 5,000 men will be trained before August

A ROYAL VISIT.

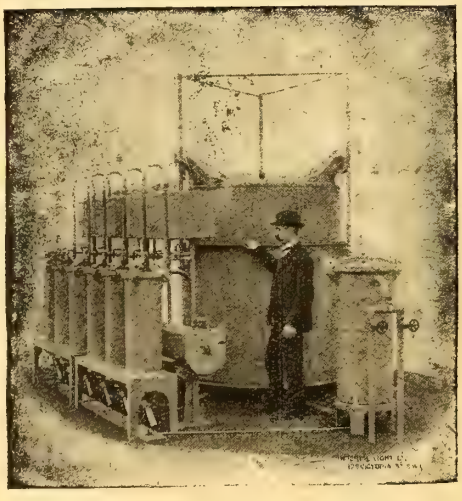
On Monday, March 25th, Her Majesty Queen Alexandra, accompanied by Her Royal Highness Princess Victoria, and attended by the Honourable Charlotte Knollys, the Honourable Violet Vivian and Sir Arthur Davidson, visited the works of Handley Page, Ltd. The party was received by Colonel Davson, representing the Air Council, Mr. F. Handley Page, and Mr. Theodore Handley Page. An inspection was made of the works, especial interest being taken in the work of women.

Bowden Wire Ltd:

LONDON
VICTORIA ROAD
WILLESDEN JUNCTION. N.W.10

Victoria Road, Willesden Junction, N.W.10.

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.



Class 5 Imperial Acetylene Welding Plant.

OXY-ACETYLENE PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

Telegrams—"Edibrac, Phone, London."
Telephone—Victoria 3540 (3 Lines)

Aircraft Fittings.

GABRIEL & CO.

Manufacturers of
AEROPLANE FITTINGS in BRASS, COPPER, GUN METAL, BRONZE AND CLARUS ALUMINIUM.

Castings supplied either Machined complete or in the rough.

Sheet Metal Work in Brass, Copper, Steel, Tin, or Aluminium, including Spinnings, Stampings and Pressings.

A.G.S. FLANGES, PETROL FILTERS, ETC.

Tube Bending and Capstan Work a speciality.

Contractors to Admiralty, War Office, Ministry of Munitions, H.M. Air Board, Royal Aircraft Factory and Crown Agents for the Colonies.

TEL. ADDRESS: GABRIEL, BIRMINGHAM
TELEPHONE: CENTRAL 1223.

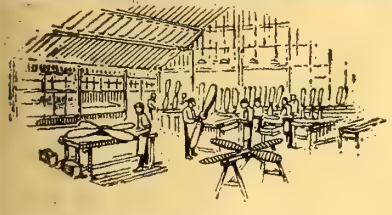
4 & 5, A. B. ROW, BIRMINGHAM

Heating & Ventilation
for
Aeroplane Factories
Munition Shops
Dope Rooms
etc.

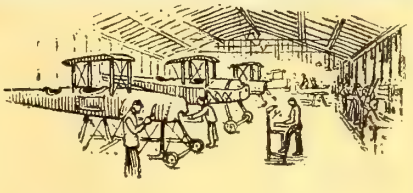
ROSSER & RUSSELL LTD
HEATING ENGINEERS
Manchester House, 37 Duke St, Oxford St, W1.
Telephone Mayfair 5210. Telegrams "Lesorus Hammer London

Work in hand
at the present time for
Messrs. Handley Page Ltd
National Aero Engine Co
Gnome & Le Rhone Engine Co
and many others

May we quote you for your requirements



MEERLOO



A.G.S. PARTS

DAY AND NIGHT PRODUCTION.
THE MOST MODERN PLANT IN LONDON.

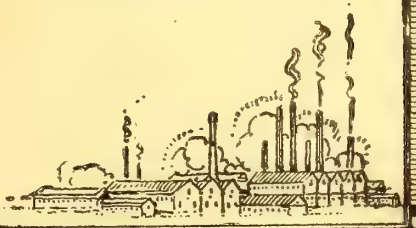
Immediate Deliveries of
NUTS, A.G.S. 115c. & 115b.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

THE MEERLOO ENGINEERING CO LTD

'Phone: STRATFORD 978.
Wires: AEROMEECOL, 'PHONE, LONDON

AERONAUTICAL ENGINEERS,
CONTRACTORS TO THE AIR BOARD
EASTERN WORKS, FOREST LANE,
STRATFORD, LONDON, E.15.
Managing Director: JOHN MEERLOO, Jun.



DEFERRED CONGRATULATIONS.

The following telegram received from the Secretary of State for the Air by the Regent Carriage Co., Ltd. :—

Secretary of State for Air and Air Council ask me to convey to your firm, your staff and workers their sincere thanks and appreciation of your able efforts during the past 6 months, which have enabled the Royal Air Force in the field to receive such satisfactory supply of aircraft equipment, and to make good their losses so well, through the unexampled fighting of last months.—(Signed) General Alexander, C.S.D. Aero Supply.

THE PEMBERTON-BILLING LIBEL CASE.

Those who are interested in the career of Mr. Pemberton-Billing, M.P., on account of his services to Naval and Military aviation may be desirous of following in detail the libel action in which he is now involved, especially as it is likely to have far-reaching results. A verbatim report of the case is to be published week by week by "The Vigilante," and copies may be obtained for 6d. post free from the offices of the Society of Vigilantes, 5, St. James's Place, S.W.1. As the newspaper reports are necessarily curtailed, and frequently edited with bias, the verbatim report is likely to be of historical value.

WAR SAVINGS AND THE R.A.F.

The number of War Savings Associations in the Army is creasing. Between Dec. 1st, 1917, and Feb. 28th, 1918, a per of three months, the men of the 1st Corps of the British Ex ditionary Force in France invested £253,120 in War Savi Certificates. It is officially stated that in order to stimulate sav in the Army permission has been given to name aeroplanes a the regiments whose War Savings Associations subscribe £2,500 that is necessary to purchase one.

This idea seems to provide an interesting sentimental link tween the Royal Air Force and the British Army, which is dominant parent, and, at the same time, the object which protects

THE SHEMUS.

The new women's service, which has been formed to rele men in the Royal Flying Corps, will be known as the Wome Royal Air Force. Unofficially it may become known as eit the Shemus or the Penguins. The objection to the w Penguin is that it is already applied to gentlemen otherw known as "Tarmac pilots."

Lady Gertrude Crawford, who has been appointed as head, will be known as Chief Superintendent.

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street Hanover Square, W.1.

BLACK ENAMEL.

AEROPLANE GREY PAINT (flat). Oil and Petrol Resisting.

TRANSPARENT WOOD FILLER.

Subject to A.I.D. Inspection.

HARLAND'S

VARNISHES, ENAMELS AND FINE COLOURS.

By Appointment to His Majesty the King.

MERTON, LONDON S.W.19.

ESTABLISHED 1791.

COPAL VARNISHES for AIRSCREWS and EXPOSED WOOD PARTS, &c.

WHITE DOPE RESISTING PAINT.

Subject to A.I.D. Inspection.



JEWELLERS BY APPOINTMENT SILVERSMITHS



Patent No. 11876/15.

THE "MILITARY" LUMINOUS WATCH.

A THOROUGHLY reliable and practical luminous watch, indispensable for Naval or Military Service. The "Military" Luminous Watch is the only Screw Case Silver Watch fitted with a "hunter" cover, and is the exclusive patent of The Goldsmiths and Silversmiths Company, Ltd.

As Illustrated. £4 12 6 Without Cover. £3 15 0

THE GOLDSMITHS & SILVERSMITHS COMPANY LTD. with which is incorporated The Goldsmiths Alliance Ltd Established 1751

Only one Address (no branches):

112, REGENT STREET, LONDON, W.

A Blizzard-Proof Coat

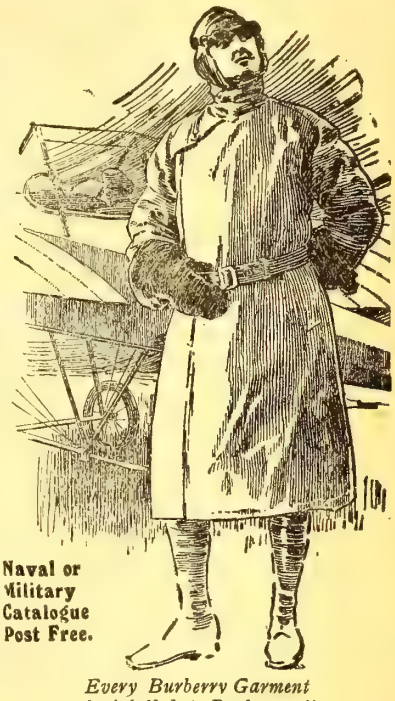
Designed by expert flying men, and made in the Burberry-proofed material chosen by Sir Ernest Shackleton for all his Polar Expeditions, The

BURBERRY AIR-WARM

provides a lightweight, yet warm and dependable, defence against rain, mist or cold wind.

The inside is of luxuriously soft, thick Camel Fleece. The coat is workmanlike in every detail, and has nothing about it to catch in any part of the machine.

Its two parts can be worn separately or together—the outside alone providing a Weatherproof that excludes wet or wind without rubber or other airtight material; the Fleece lining, a smart British Warm; and the two together the staunchest self-ventilating safeguard possible.



Naval or Military Catalogue Post Free.

Every Burberry Garment is labelled "Burberrys."

The New Uniform for The ROYAL AIR FORCE is now on view at urberrys.

BURBERRYS Haymarket S.W. 1. LONDON

8 & 10 Bd. Malesherbes PARIS; also Provincial Agents

The All British Standard LIGHT CAR



The Standard Motor Co., Ltd., Coventry.

London Agents: The Pytchley Autocar Co., Ltd., 216, Gt. Portland Street, W.

Of special interest to Government Contractors.

J.B. BROOKS & CO LD

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments, and Cases of

LEATHER

J.B. Brooks & Co Ltd 104 Criterion Works Birmingham.

1131

The terms of service and conditions are based on those of the W.A.A.C. and the W.R.N.S., and recruits must enrol for the duration of the war. About 300 officers are required, who will be enrolled by the Professional Registry, Queen Anne's Chambers, and the ranks will be recruited by the Ministry of Labour Employment Bureaux or recruiting offices.

The uniform has not yet been decided upon, but it is practically settled that it shall be of khaki and similar to that of the W.A.A.Cs. At present the force will be largely immobile, but a mobile section will be formed, and the ranks will live in hostels at the stations to which they are attached.

Lady Gertrude Crawford is the daughter of the fourth Earl of Sefton and sister of the present peer. She married in 1905 Lt.-Col. J. H. Crawford, Indian Army. She is a master turner, and has been engaged in practical munition work since the early days of the war, having been associated with Lady Moir in an enterprise to bring educated women into munition factories.

THE INVASIONS OF ENGLAND.

The Commissioner of the Police states that when an air raid warning is received between sunset and the time fixed for drawing blinds, all lights must at once be obscured.

In view of the coming into force of "Summer" Time t following new times for drawing blinds in London are issued :-

	p.m.
April	9. 0
May	9.30
June-July	10. 0
August 1st-15th	9.30
August 16th-31st	9. 0
Sept. 1st-15th	8.30
Sept. 16th-29th	8. 0

Lights must remain screened till an hour before sunrise Summer Time in each case.

MORE AIRCRAFT PAY

In regard to a recent claim made to the National Engineeri Federation by the National Federation of General Workers Committee on Production has approved of the payment of 1 per cent. to plain-time workers in federated establishmer throughout the kingdom who are wholly engaged in the ma facture of aircraft or aircraft parts.

OFFICIAL ACCEPTANCE TESTS

LAND MACHINES.

S.P.A.D.	*Avro*
Sopwith	*Armstrong-Whitworth*
B.E.	*D. H. 4.*
Short	*Handley-Page*
Curtiss	*Bristol*
Mann. Egerton	*Vickers*
M. Farman	*Nieuport*
H. Farman	*Supermarine, &c.*
Morane	

SEAPLANES.

Short, Sopwith, America Boats, F.B.A. Boats, Curtiss Boats, Norman-Thompson, A. D. Boats, &c.

Private Aerodromes Surveyed and Pilots' Reports Furnished.

DELIVERY AND EXPERIMENTAL FLIGHTS

ON LAND MACHINES & SEAPLANES.

COMPLETE REPORTS FURNISHED.

Rates on application to

THE PRODGER - ISAAC AVIATION COMPANY

(C. B. Prodger and Bernard Isaac),

166, Piccadilly, London, W.1.

Telephone: Gerrard **278** *(2 lines.)*

Telegrams: "**Aeromnia,** *Piccy, London.*"

CLIFFORD B. PRODGER

J. LANKESTER-PARKER,

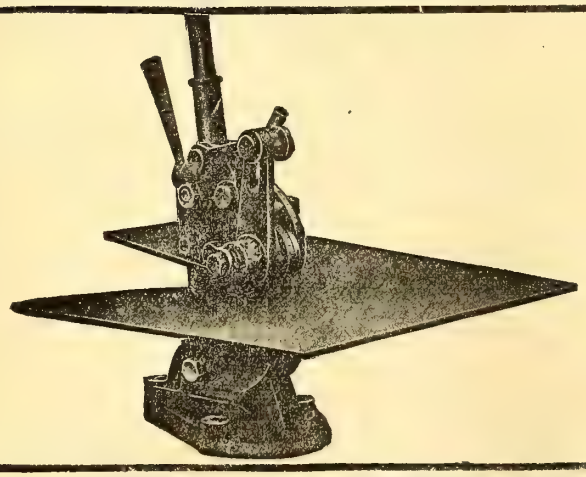
and other Pilots.

Approved Admiralty Pilots —for Acceptance Trials.—

INSURANCE.

WE are now in a position to quote low rates, through our brokers at Lloyd's, for the Insurance of Aircraft during ACCEPTANCE TRIALS AND DELIVERY FLIGHTS with an excellent and most comprehensive Policy. May we quote you for your new contracts?

SPECIAL ARRANGEMENTS with Sub-Contractors for HANDLEY-PAGE Type Land Machines or "AMERICA" Type Flying Bo



'TANGENT'

HAND SHEET SHEARING MACHINE

PATENT.

SELF-FEEDING, FAST CUTTING.

STEEL, 3/16 SOFTER METAL, 1/4.

Write for Descriptive Pamphlet and Prices.

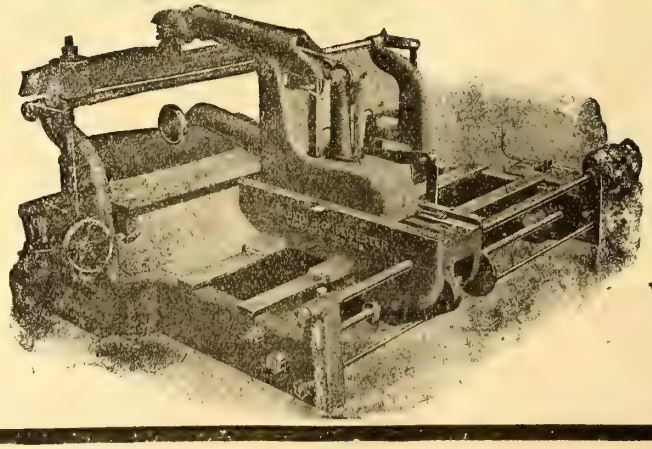
MONTGOMERY, SMITH & Co., Ltd.,

PATENTEES AND MANUFACTURERS,

TANGENT WORKS, KEYNSHAM, SOMERSET.

AUTOMATIC PROPELLER SHAPER K.E.

As supplied to all the leading propeller makers.



Every blade identical.

Less balancing required

Saves labour.

Increases output.

Write for list of users.

WADKIN & CO LEICESTER.

Telegrams: "Woodworker."

'Phone: 3614/5.

LIGHT STEEL STAMPINGS for AEROPLANES

Any size or weight: Rough or Machined: Single piece or Combination pressed and welded by Oxy-acetylene and other processes.

JOSEPH SANKEY & SONS, LTD.,
—Hadley Castle Works, Wellington, Shropshire.—



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

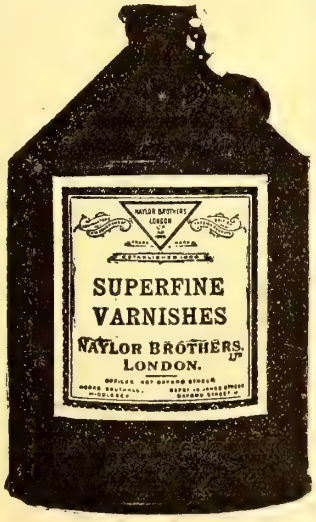
Robinson & Cleaver Ltd.
The Linen Hall, Regent Street, London, W.

THE USE OF

NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.
Contractors to all Government Departments.

Offices: 407/9, OXFORD St., LONDON, W. Works: SOUTHALL MIDDX.

MOSS-GEARING

AERO-ENGINE GEARING



Manufactured on principles ensuring greatest

STRENGTH AND **ACCURACY.**

GEARING—FLYWHEELS—CAMSHAFTS

R.A.F. PROPELLER BOSSES.

Our Aero parts are made in specially **HIGH TENSILE STEEL**, heat treated and all parts corrected for distortion.

TRANSPORT, LORRY & PLEASURE CAR GEARING

Bevel and Worm Drives accurately generated. Steering Worms and Sectors. Spur and Bevel Differentials. Gear Box Gears. Camshafts with guaranteed Glass-hard Cam Profiles.

THE MOSS GEAR CO., LTD.,
W. DUCKITT, *Managing Director*, Thomas St., Aston, BIRMINGHAM

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



THE
BRITISH WRIGHT
CO. LTD.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

Manufacturers of

AERONAUTICAL INSTRUMENTS

FOR

NAVY & ARMY AEROPLANES

Ogilvie Air Speed Indicators

For use on Aeroplanes, Airships, Kite Balloons and Air Stations.

Statoscopes.
Recording Manometers.
Wind Speed Recorders.

At present the Government is taking the entire output, but British and Foreign Firms are invited to place their orders now for delivery of Aeronautical Instruments after the war.

The BRITISH WRIGHT Co. Ltd.
33, CHANCERY LANE, LONDON, W.C.2.

PROPELLERS ONLY.

W. D. ODDY & Co.
LEEDS.

CONTRACTORS TO H.M. GOVERNMENT

S.B.A.C. The Society of British Aircraft Constructors

Office & Works—
Propeller Works,
Balm Road,
Hunslet,
Leeds.

Telephone—
Central 291.
Telegrams—
Airscrews, Leeds.

Telegraphic Address: Poetry, 'Phone London.
Telephones: Avenue 995, 996, 7996.

(Partners:
H. W. Pritt,
W. G. Pritt,
P. W. Smallwood,
E. R. Hill),

PRITT & CO.

METAL WAREHOUSEMEN, MUNITION AND AERONAUTICAL CONTRACTORS

46, FENCHURCH STREET, LONDON, E.C. 3,

Where all communications must be addressed.

CITY WAREHOUSES: 62a & 64, Vine Street, Minories E.C.
DEPOTS: Paddington, Poplar, Shoreditch.

We hold good stocks, complying with Air Board, R.A.F. and Admiralty Specifications, of the following:

BRASS & COPPER in sheets, tubes, rod, wire, etc.
TINNED STEEL SHEETS.
MILD STEEL SHEETS 9a.
BRIGHT DRAWN MILD STEEL BARS, 5a.
A. G. S. BOLTS, NUTS AND WASHERS.
COPPER RIVETS. TINMAN'S SOLDER.
SOLDERING IRONS.
BEST SWEDISH WELDING WIRE.
BRAZING SOLDER in wire and granulated Form.
SILVER SOLDER. WIRE GAUZE, &c.

All material passed A.I.D. before despatch.

DAILY DELIVERIES made by our own vans within a radius of 15 miles of our Warehouses.

NOTE.—All orders for Aeronautical Work receive especially prompt attention.

WE ARE BUYERS OF SCRAP BRASS & COPPER.

CONTRACTORS TO H.M GOVERNMENT

W.T.CLARK & CO.



Telephone No. Central 2121.

5, GREEN TERRACE, ROSEBERY AVENUE, LONDON, E.C.1.

Telegrams Etalspinne Islington London. Two Words.

METAL SPINNERS
and
SHEET METAL WORKERS
for Aeroplane Constructors

METAL SPINNINGS for AEROPLANES

Cowlings (COMPLETE SET) Fairings
Coverings Petrol Tanks
Undershields Shields etc.



BEATEN COWLS OF EVERY DESCRIPTION

SPUN COWLS UP TO 48 INCHES IN DIAMETER.



BRIGHT BOLTS & NUTS



¼in. diam. & upwards

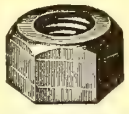
(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅜in. to 2½in.)



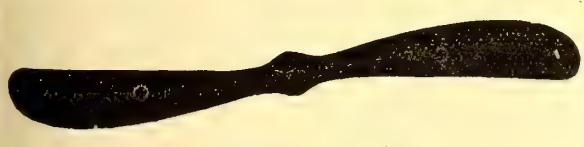
(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.

London Offices: 139/141, CANNON ST. E.C.4

CHAUVIÈRE'S
Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone Kingsbury 104.

Contractors to H.M. Government.

SWIFT
AVIATION CO.

Dolphin Engine Plates in Stock, Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE—
762 KINGSTON

'GRAMS—
"SWIFT, KINGSTON"

R. F. & F. W. BROWN

(F. W. BROWN.)

Wollaton Saw Mills
Near Nottingham

ENGLISH ASH FOR AEROPLANES

Bent Timber Manufacturers.

Telephone .. 1526 Nottingham. Telegrams .. Browns, Sawmills, Wollaton.

A.G.S. WASHERS

Turn Buttons.
Eyelets.
Washers.

Wire Work.

THIMBLES

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

THE AIRCRAFT CONSTRUCTION CO.

EVERY DESCRIPTION OF METAL COMPONENTS.

Immediate Delivery of SE SUMPS.

HARLEY AEROPLANE WORKS, Beckton Rd., E. 16
Telegrams: "Aercracons," Canning, London. 'Phone: East 1300.

"NOVELLON" DOPE

AND AEROPLANE VARNISH.

CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED.

Telegrams:
Cellutate, London.

8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4045.*

Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)

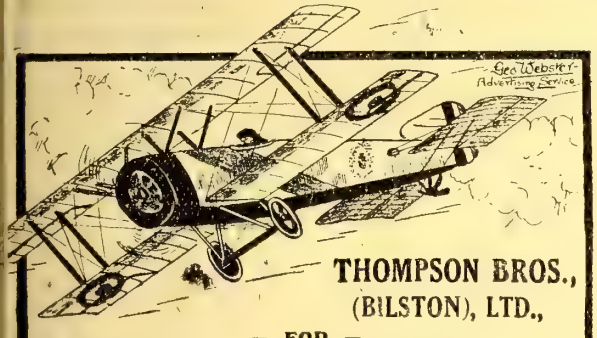
The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE AIR SERVICES.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

THE SIBERIAN & GENERAL TRADING CO., LTD.
Can supply from stock or for prompt shipment
PLYWOOD
IN ALL WOODS, SIZES AND THICKNESSES.
SPECIALITY: BOARDS FOR AIRCRAFT WORK.
HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.



THOMPSON BROS., (BILSTON), LTD.,
— FOR —
UNDERCARRIAGES
TUBULAR FRAMEWORK
AERO. DEPT. BILSTON, Staffs.

CHANDELIER CHAIN
FOR ALL PURPOSES.



Dozens of Sizes. Buy from Actual Makers.
Also all kinds of
PRESSINGS, STAMPINGS & PIERCINGS.
SMITH AND DAVIS, LIMITED.
BRASSFOUNDERS, BIRMINGHAM.

Aeroplane Steel Sheets
as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers
Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")
BERNARD NICKLIN & CO.
IRON AND STEEL WAREHOUSE
SMETHWICK, BIRMINGHAM
Telegraphic Address: "Bernico," Birmingham. Telephone No.: 224 Smethwick.

HEATING AND VENTILATION
DOPE SHOPS, AERODROMES, AND AIRCRAFT FACTORIES.
WHEELER & SONS, Phone—PARK 652.
1a, VICTORIA GARDENS, LONDON, W.11.

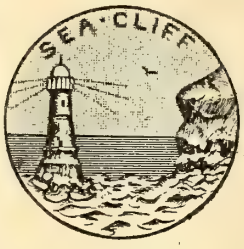
HEATING, DRYING AND VENTILATION.

Kinnell's

OF DOPE SHOPS, AERODROMES AND AIRCRAFT FACTORIES, &c. OF EVERY DESCRIPTION. List 1134 free.

C. P. KINNELL & CO., LTD. Phone—Hop 372
65, SOUTHWARK ST., LONDON, S.E.1.

Manufacturers of **PHOSPHOR BRONZE, GUN METAL,**
MANGANESE BRONZE.
BRASS & COPPER,
TUBES, SHEETS, RODS, WIRE, AND
CASTINGS.
PHOSPHOR TIN, PHOSPHOR COPPER.



CHARLES CLIFFORD & SON, LTD.,
BIRMINGHAM.

"CROID"
LIQUID GLUE
Adopted by H.M. Admiralty, etc.
Sole Manufacturers:
The Improved Liquid Glues Co., Ltd.,
Gt. Hermitage Street London, E.
Contractors to H.M. Government.

The Air Navigation Co., Ltd.

BLERIOT & SPAD AIRCRAFT WORKS,

ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director.

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

Aluminium Castings

Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

Contractors to H.M. Government
Chill Castings for Aeroplanes a Speciality

Telephones: 3546 City. 4879 Central. Telegrams: Krankcase, Isling, London

R. W. COAN
The Aluminium Foundry
219, COSWELL ROAD, LONDON, E.C.

COAN CASTS CLEAN CRANK CASES

SALMSON AERO-ENGINES

(Canton-Unné System).

All enquiries should be addressed to

THE DUDBRIDGE IRON WORKS, Ltd.
STROUD,
GLOUCESTERSHIRE.

London Office:
87, *Victoria Street, S.W.1,*

FREMO PERFECT TAPER PINS

ANY SIZE. ANY TAPER. SPLIT OR SOLID.
FREDK. MOUNTFORD, Ltd.,
FREMO WORKS, LIFFORD, BIRMINGHAM.

ZOTA WORKS BOLTS NUTS ZOTA WORKS
CASHMORE BROS. *ENGINEERS*
ZOTA WORKS, HILDRETH ST., BALHAM, S.W.12
Telephone—BATTERSEA 416
BOLTS, NUTS, SCREWS, etc. in Brass & Steel for **AIRCRAFT**
REPETITION WORK FOR ELECTRICAL, MEDICAL, AND OPTICAL INSTRUMENTS, AND FOR THE MOTOR TRADE
ZOTA WORKS SCREWS — ETC. ZOTA WORKS



PRESS-WORK & SPINNINGS

and Sheet Metal (War) Work generally.

The LONDON ALUMINIUM Co., Ltd., Aircraft Dept.,
Westwood Road, Aston, B'ham. 'Phone: East 497.

RUBBER PETROL RESISTING HOSE, TUBING & CONNECTIONS PHONE CITY 3811 3812

WASHERS, RINGS, BUFFERS, SHEET, STRIP, MATTING, MOULDINGS.

JAMES LYNE HANCOCK, Ltd., 266, Goswell Rd., London, E.C.1

HIDE GLUES *FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.*

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

THE

"BOWSER" AEROPLANE SEATS

(Made to A.G.S. Drawing 264).

Supplied to the Royal Aircraft Factory and the Leading Aircraft Manufacturers.

Manufactured by **EDWARD BOWSER, 50, Park Lane, Leeds.** Tel. No.: Central 3473.

Under the A.I.D. Inspection.

Northern Representative—
Mr. WALTER M. DANIELL,
33, East Beach, Lytham.

Telephone—East 3833

THE STANDARD Aircraft Manufacturing Co., Ltd.

28, BOW COMMON LANE, LONDON. E.3.

Auster (1914) LTD

for **AUSTER-TRIPLEX SHIELDS**

AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

BIRMINGHAM:
Crown Works, Barford Street.
Telephone; Midland 2123.
Telegrams: "Auster, Birmingham."

EBORA PROPELLER Company, 218 Surbiton Park Terrace, KINGSTON on Thames. Telephone KINGSTON 672. Telegrams EBORA, KINGSTON

Ebora Propellers

Contractors to the Admiralty and War Office
SCHOOL PROPELLERS
FOUR BLADERS
SEAPLANE PROPELLERS
SLATE TABLES For PROPELLER WORKS

Lang Propeller LTD.

Contractors to the Admiralty and War Office.

WEYBRIDGE, SURREY.

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 5912. E. H. Godbold, Director
GODBOLDS

AEROPLANE STAMPINGS
IN 3 PLYWOOD,
SMALL PARTS UP TO 12 ins. by 4 ins.
A. W. ROSS, 20, HERTFORD RD., KINGSLAND RD., LONDON, N.1

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

Clegg Metal Engraving Co.
Chatsworth Works, Worthing,
For Dials, Scales, Name-plates and Address Plates, and Instruction Plates, in Metal, Ivorine, Etc.
Either Chemically Engraved or Machined.

ALWIN ENGINEERING CO., AERONAUTICAL ENGINEERS,
A. E. CARTLIDGE. LUTHER ROAD, TEDDINGTON, S.W.
Tel. No. Kingston 2412.
TRADE MARK ALWIN
Makers of all kinds of Aircraft Fittings.
Presswork a Speciality,
Pressings for DeH, et
Avro, Sopwith, Fairey and many other typ
On receipt of Post Card our Representative will call and give immediate quotation.

Springs! Springs! Springs!
We make a speciality of
Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

SYSTEMS at RACING & ROULETT
A book of absorbing interest to all System lovers, showing how a regular and substantial income can be earned with small capital.
Price—THREE PENNY STAMPS.
SIMPLEX PUBLISHING, 1, NEW OXFORD STREET, LONDON, W.

Clean Coloured Rags
FOR CLEANING & WIPING.
Best and Cheapest for Munition Works :: Engineers, Printers & Bus Companies, etc.
A. JOSEPH, EARL STREET, LONDON ROAD, LONDON, S.E. 1.
Telephones: Hop 83, 361 & 4272. "Cheaper than cotton waste."

P.D.V. Aircraft Company, Lt
All Metal Parts for Aircraft made, comprising following machine work: Milling, Turni Shaping, Press Work, Slotting, Drilling, Grinding a Sheet Metal Work. Well-equipped Welding and Brazing Pl
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices & Works: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmon

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LT
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 13 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING
RUSSELL BROTHERS, Ltd., REDDITCH
MACHINES.

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

SHENSTONE & Co., LTD.
AIRCRAFT DEP.
LEYTON.

AIRCRAFT PRODUCTION WITH MODERN METHODS.

E. KEITH DAVIES, General Manager. **Telephone: WALTHAMSTOW 24.**

MISCELLANEOUS ADVERTISEMENTS.

...ATIONS WANTED.—Continued.

...Equipment Officer (invalided), exten... ...onnected, electrical and mechanical en... ...with considerable aircraft and commer... ...erience, desires position home or abroad ...NAGER of Business, Branch, Works, ...partment, or as **LONDON REPRE...ATIVE** for engineering or aircraft firms ...l standing. In case of latter, if whole ...s not required, would accept nominal ... with commission, and provide own ... Advertiser is an organiser, a man of ...s, quick of action and decision.—Box ...183, THE AEROPLANE, 166, Piccadilly,

WANTED.

...ll Woodwork for aeroplanes, very large ...ate factory, fully equipped with latest ...es; any class of aircraft work under... prompt deliveries; best work.—Apply ...30, THE AEROPLANE, 166, Piccadilly, W.1

...ering Firm with well-equipped machine ... now engaged on munitions, solicits ...es for all classes of turning, drilling, ...g, milling, fitting, etc. Aircraft fit... also copper pipe work, a speciality. ...pondence with a view to post-war ...s especially invited.—The Lankester ...ering Co., 39, Eden Street, Kingston-...mes.

... Twill Cuttings, in any quantity. ... average size, quantity and price ...d, to Aylen, 38, Sun Street, London,

...Process. Aluminium Repairs. No dis... ... Cylinder welding and reboring. ... pistons (certificates only). — Address, ...inium Repair Co., 60, Hardman Street, ...ester. Tel., 4087 City.

... copies of THE AEROPLANE—whole of ...; also numbers of Vol. I. for Oct. 19th, ... of Vol. II., Feb. 8th, 1912; of Vol. III. ... 11th, 1912; of Vol. IV. for Jan. 23rd, ...h, and March 27th, 1913, and of Vol. ... Sept. 6th, 1916. Any of these numbers ... of service.—Write, stating price, to ... Z., AEROPLANE, 2, Bream's Buildings,

..., Machine Work for aeroplanes by ...orking mill in West London.—C., 24, ... Street, Bryanston Square, W.1.

..., aircraft wood work. First-class work ... parts, well equipped, prompt attention, ...nce in making and assembling.—State ...rticulars to Box No. 3486, THE AERO... 166, Piccadilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page II. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264 or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester.

We undertake Contracts for light engineering work. Ask for quotation.—R. L. Dubois & Co., Aeronautical Engineers and Manufacturers, 673, Romford Road, Manor Park, E.12.

We are open to supply Ash, sawn to dimensions for Aircraft or other War Work.—Apply, Box No. 3493, THE AEROPLANE, 166, Piccadilly, W.1.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road, Manchester.

MODELS.

T. W. K. Clarke and Co., Ltd., Model Department, Hampton Wick.—Though we are full up with full-size aeroplane parts orders, we still build models as we did in 1906. Sopwith Biplanes, etc., in Stock.—Send 3 stamps for our illustrated List, 120 items and 14 models; certain metal goods are out of stock.

Model Motors.—First-class ½-h.p. Motors, air or water-cooled, castings, with cylinder-bored valves bored, crank-cases spigotted, sparkplug tapped, valve box machined out; instructive. See list price, 2d. Catalogue—Gas, Oil, Petrol Motors — 2d. — Littleover Motors, Derby.

FOR SALE.

Tarpaulins.—Waterproof khaki sheets for sale; also few second-hand railway truck tarpaulins; London works.—For prices and particulars write Johnston, 12, Broughton Road,

Inventor wishes to dispose of patent of improved Inclinometer for Aircraft.—Address inquiries to Box No. 3494, THE AEROPLANE, 166, Piccadilly, W.1.

AVIATION

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Engineer in Aeronautics. Demonstrations from complete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTITUTE LTD.,

10, Heddon Street, Regent Street, W.1.

MISCELLANEOUS.

Luminous paint for wrist watches, clocks, match boxes, etc.; remains luminous for years. Bottles 1/9 and 2/9.—Tobin & Co., 39, Charles Street, Hatton Garden, E.C.

MAKE MONEY BY WRITING.

£50 PRIZE. Send postage (2d.) for particulars and copy of "How to Earn Money while Learning How to write for Newspapers and Magazines." Practical and Comprehensive Correspondence Courses—Fiction and Articles, etc. Expert Literary Directors. Constructive Criticism. Beginners taught how to make work saleable. Exceptional testimonials. Address "Editorial" (Dept. E.M.), 22, Chancery Lane, London, W.C.2.

BOOKS

By Lieut. Victor W. Page of the U.S. Air Service.
JUST PUBLISHED.

AVIATION ENGINES. Their Design, Construction, Operation, and Repair. A book for the Student, Engineer, and all interested in Aviation, by a recognised authority. Giving practical instruction on repair and maintenance not to be found elsewhere. Medium 8vo. 580 pages, with over 240 very distinctive and specially made Engravings.
Price Net **15s.**

GLOSSARY OF AVIATION TERMS in English-French and French-English. Crown 8vo. 100 pages, with Plates and Illustrations.
Price Net **5s.**

AN AVIATION CHART. A large Wall Chart, showing a typical Aeroplane Power Plant in Part Section, with all important components shown Folding to Pocket Size. Price Net **2s. 6d.**

London: CROSBY LOCKWOOD & SON
7 Stationers' Hall Court, E.C.4.

MISCELLANEOUS ADVERTISEMENTS.

SPECIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISE in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions, Contracts, etc., 1 For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, Lond

PATENTS.

PAGE & ROWLINSON, Chartered Patent Agents (Consulting Engineer, Mr. S. E. Page, A.M.Inst.C.E.), 27, Chancery Lane, London, W.C. Tel. 332 Central.

Henry Skerrett, Chartered Patent Agent, 24, Temple Row, Birmingham.—Patents, trade marks, and designs.

Inventors advised free. Write for booklet.—King's Patent Agency, Ltd., 165, Queen Victoria Street, London. 30 years' references.

Stanley, Popplewell and Co., Patent Agents and Consulting Engineers. Applications for Patents attended to in all countries.—38, Chancery Lane, W.C. Telephone: 1763 Central. Circular free.

SITUATIONS VACANT

A Large Firm, London, N.W., has several vacancies for aeroplane erectors and assemblers, used to accurate and high-class aeroplane work. No one living more than 10 miles away or engaged on Government work need write to Box 3360, THE AEROPLANE, 166, Piccadilly, W.1.

A large London firm connected with aviation has a vacancy for a first-class **Outdoor Representative** who must be exempt from military service. Invalided flying officer will be given preference.—"Representative," Clayton's Advertising Agency, 52, Shaftesbury Avenue, W.1.

Draughtsmen and Assistant Draughtsmen required on aeroplane work; good mechanical experience essential. No one on Government work need apply.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3457.

Wanted by a large London Aircraft Engineering works a number of good **Mechanical Draughtsmen**—men with previous aeronautical experience preferred. Write stating age, experience and salary required. No one will be engaged who resides more than 10 miles away or who is on Government work.—Write Box 263, Sells, Ltd., 168, Fleet Street, E.C.4.

A large number of Fitters with experience of aircraft work are required for London aeroplane factory. Full rate and war bonus. No one living more than 10 miles away or on Government work will be engaged.—Write Box No. 268, Sells, Ltd., 168, Fleet Street, E.C.4.

AIRCRAFT WORKS, LONDON.

Purchasing Department.

Applications are invited for the post of head of purchasing department in a large aeroplane manufacturing firm. Applicants must have had wide commercial experience in the purchase of engineers' materials and tools, and in sub-contract work. Full details must be sent to experience and previous positions held. Age and salary required must be stated. All such details will be treated in strict confidence. No one will be engaged who is on Government work or resident more than ten miles away.—Write, Box 3400, THE AEROPLANE, 166, Piccadilly, W.1.

Manager, experienced, required for control and superintendence of works making propellers and aircraft spares—Controlled. Must have had similar experience. No one on Government work will be engaged.—Apply, with full particulars, stating age, salary required, etc., to your nearest Employment Exchange, mentioning this paper and No. 532.

Inspectors, first-class, wanted for aeroplane engine erection. No one engaged on Government work considered.—Apply at your nearest Employment Exchange, mentioning this paper and No. 4991.

Storekeeper for aeroplane parts; able to check in goods from copies of orders, and supervise serving out of same. State experience and salary required. Nobody already engaged on Government work or residing more than 10 miles away need apply.—Write, Box 60, Horncastle's, 60, Cheapside, E.C.2.

Buyer and Progress Man for metal parts. State experience and salary required. Nobody already engaged on Government work or residing more than 10 miles away need apply.—Write, Box 57, Horncastle's, 60, Cheapside, E.C.2.

RADIATOR AND SHEET METAL WORK

UNION WORKMEN

(BEST RATES PAID)

WANTED

No one already on Government work, or resident more than ten miles away will be engaged.

Apply—

GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.3

SITUATIONS VACANT.

AERO ENGINE WORKERS WANTED

(BEST RATES PAID.)

TOOLSETTERS, TURNERS, MILLERS AND FITTERS.

No one on Government work or resident more than 10 miles away will be engaged

APPLY—

GILLETT, STEPHEN & Co., LTD
BOOKHAM, SURREY.

Aircraft Works, London, N.W.—Man wanted to take complete charge of steel stores. Knowledge of decimal and millimetre sizes essential. Also an experienced man to take charge of finished wood part stores. No one need apply who lives more than 10 miles away or who is on Government work.—Write, Box 283, Sells, Ltd., 168, Fleet Street, E.C.4.

Experienced Man wanted to take charge of receiving department in large aeroplane factory stores. Applicants must be conversant with stores routine, and the handling of large quantities of goods expeditiously. No one will be engaged who lives more than 10 miles from London, N.W., or who is on Government work.—Write, Box 284, Sells, Ltd., 168, Fleet Street, E.C.4.

Foreman Welder required for Government controlled aircraft contractors. Top rate pay. No one resident more than 10 miles away or engaged on Government work need apply.—Call, Dollis Hill Works, Duddenhill Lane, Willesden, N.W.10.

Aeroplane Fuselage Assemblers require men with experience of H. P. machi ferred.—Apply, giving particulars of ence, rate of pay, to A. C. H., Box N THE AEROPLANE, 166, Piccadilly, W.1. already engaged on Government work dent more than 10 miles away need a

Aeroplane Factory Progress Departme gineer required, capable of taking ch progress department of large aeroplan factory works (London). He must hav thorough engineering works training, acquainted with modern methods of pro and be very systematic in his books. be directly responsible to the superinte the factory, and have entire control of gress staff in the various departments. salary will be paid to a capable man. stating age and salary required, and full particulars of past experience, held, and when free to commence. need apply who is living more than away or engaged on Government Write, Box No. 3487, THE AEROPLA Piccadilly, W.1.

Aeroplane Erectors (final erection) and fitter-erectors required for De H. 9 m No one residing more than 10 miles engaged on Government work need Ruffy, Arnell, and Baumann Aviatio Ltd., Noel Road, Acton, W.3.

Draughtsmen, senior and junior, requir ferably accustomed to aero engine wor experienced lady tracer, at once. No gaged on Government work or residin than 10 miles away need apply.—B 3485. THE AEROPLANE, 166, Piccadilly,

Tracers required by well-known Lond in S.W. district; several experience tracers. No one employed on Gov work need apply.—Write, stating age, ence, and salary required, to your near ployment Exchange, quoting No. A502

Inspectors of aircraft metal fittings for Government Controller Aircraft Fa Eastern Counties.—Apply, stating age, ence, and salary required, to nearest E ment Exchange, mentioning this pap No. 3492. No one already on Gove work can be engaged.

Tool Makers, Fitters, Inspectors, requi Government Controlled Establishme Eastern Counties. Good wages paid.— stating age, experience, to nearest E ment Exchange, mentioning this pap No. 3491. No one already on Gove work can be engaged.

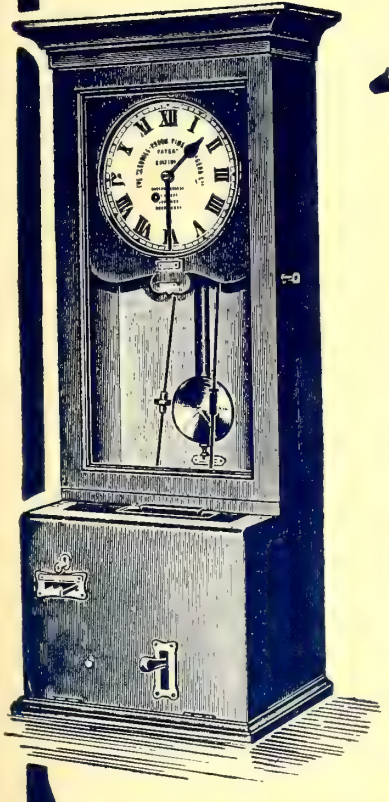
SITUATIONS WANTED.

Works Manager, or position of tru practical engineer, invaluable experienc aeroplanes and seaplanes. Tactful, getic, methodical organiser, accustome latest service methods and capable of eco cally increasing production.—Box 3284, AEROPLANE, 166, Piccadilly, W.1.

Manager or Works Superintendent, sho liberty; 4½ years' aircraft work; organis economical producer; general engineeri perience. Age 38.—Box No. 3489, THE PLANE, 166, Piccadilly, W.1.

Flying Officer, with practical engin knowledge (apprenticed), willing to ente tract with an aviation company for serv any foreign country after peace is de Willing to learn language.—Box No. THE AEROPLANE, 166, Piccadilly, W.1.

Always up to time



THE TIME STAMPED
ON THE CARD...
ALWAYS AGREES
WITH THE CLOCK

A BRITISH MACHINE
THROUGHOUT.....
ENSURES CORRECT
ESTIMATES.....

THE GLEDHILL-BROOK TIME RECORDERS LTD
26 Victoria St LONDON, S.W. 44 Hill St BIRMINGHAM.
43 MARKET St HUDDERSFIELD.

WYCOMBE AIRCRAFT CONSTRUCTORS, Limited.

HIGH WYCOMBE,

BUCKS.

Telephones: High Wycombe 84 (Stores: High Wycombe 120).
Telegrams: "Aircraft, High Wycombe."

CONTRACTORS TO THE ADMIRALTY AND AIR COUNCIL.

SHORT BROTHERS,

Aeroplane and Seaplane Works,

ROCHESTER, KENT,

AND

Aircraft Works & Flying Grounds,

BEDFORD.

Telephones:—
627 Chatham.
261 and 262 Bedford.
788 Battersea.

Telegraphic Addresses:
"Seaplanes," Rochester.
"Shorts," Bedford.
"Ballooning," London.

London Office: WHITEHALL HOUSE, 29/30, CHARING CROSS, S.W. 1.
Telephone: 378 Regent. *Telegrames*: "Tested, Phone, London."

EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W.1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passage, London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. Grey

WEDNESDAY, APRIL 17, 1918.

Vol. XIV. No. 16 THREEPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

THE NORMAN THOMPSON FLIGHT CO. Ltd.

ESTABLISHED 1909

Telegrams—SOARING, BOGNOR
INTIFLYTE CHARLES, LONDON

Works—MIDDLETON, BOGNOR

CONTRACTORS TO THE ADMIRALTY

Telephone—BOGNOR 48. GERRARD 7385

London Office—
DEWAR HOUSE, 11, HAYMARKET, S.W.1.

DESIGNERS AND MANUFACTURERS OF FLYING BOATS AND LAND PLANES

Auster FOR **Aero-shields**

LONDON. BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE

NON-POISONOUS

DOPE

SEE ADVERT. INSIDE

TELEPHONE:- OLDBURY 111.

ACCLES & POLLOCK, LIMITED.

TELEGRAMS:- ACCLES OLDBURY

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.

TRIPLEX SAFETY GLASS

The TRIPLEX SAFETY GLASS CO., Ltd. 1, Albemarle St., London, W.1.

THE
Engineering Timber Co., LTD.

Beg to advise their Northern customers that they have now established a Branch

AT

CUNARD BUILDINGS, LIVERPOOL.

Telephone: BANK 3944. **Telegrams: ENTIKOSIL, LIVERPOOL**

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK.

SAFES.

COOKE'S (FINSBURY) LTD.

FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

Telephones { LONDON WALL { 6179 573

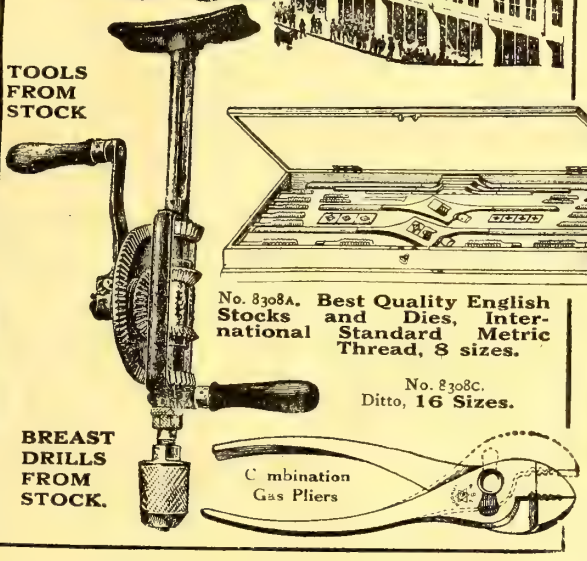
See Telephone Book relating to our Shopfitting, Signs and other Departments

Brown's Buildings
Great Eastern Street,
London, E.C.2.

North of England Depot
DEANSGATE, MANCHESTER
and at Dublin, Paris & Melbourne

TRADE. BBL MARK

Brown Brothers LTD.



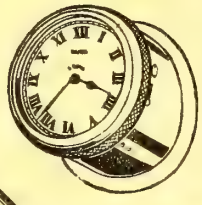
TOOLS FROM STOCK

No. 8308A. Best Quality English Stocks and Dies, International Standard Metric Thread, 8 sizes.

No. 8308C. Ditto, 16 Sizes.

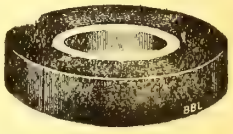
BREAST DRILLS FROM STOCK.

Combination Gas Pliers



The "DUCO" EIGHT-DAY CLOCK. Superior workmanship and finish, rain and dust proof, and an excellent timekeeper.

No. W2/2 Brass and Plated.



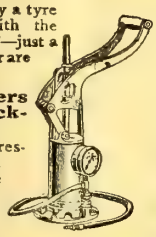
INSULATING TAPE. Good Quality. ¾ in. wide. No. W11/5.



"CLOVER" VALVE GRINDING COMPOUND. Grinds quicker and better than emery, and is always ready for use with the administration of oil and water.

Sold in 4oz. duplex can (containing two grades—"C" for roughing and "A" for finishing) 1/1

...is surprising how quickly a tyre ...n be fully inflated with the ...eason-Peters "Pumps"—just a ...y easy strokes of the lever are ...that is necessary.



...e Gleason-Peters ...re Pump. "Quick-Service" Model. ...inder, 3¼ by 6½ ins. Pres-...125 lbs. Extreme height ...ins. Diameter of base ...s.



BRASS HOSE CLIPS for Water Connections. All sizes from stock.

...UCO" ...AND ...EANER. ...pletely removes ...most obstinate ...s in an instant. ...septic and bene-... to the skin. ...be used with hard, soft, hot, cold, or salt ...r. If your hands are covered with heavy ...grease, or chemical stains, rub in a little ..."CC" and in less than a minute ...hands are soft and white ... 7d. Per Tin



Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

ADAM, GRIMALDI & Co. LTD.

GOVERNMENT CONTROLLED ESTABLISHMENT

UNDER THE MUNITIONS OF WAR ACT.

AIRCRAFT MANUFACTURERS
- CONTRACTORS TO H.M. GOVERNMENT -

ALBERT WORKS, GLASSHOUSE STREET,
ALBERT EMBANKMENT, VAUXHALL, S.E.11

Telegrams: "Autocoach, 'Phone, London."

Telephone: Hop 5552 (3 lines).

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
47, VICTORIA ST., S.W.

Works:
HIGH ST., MERTON, and HENDON

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

"NOVELLON" DOPE

AND AEROPLANE VARNISH.

CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED.

Telegrams: *Cellutate, London.*

8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4045.*

Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)



Founded 1797

FOR over a hundred years the mark of Boulton & Paul on any article has meant that it represented the highest utility at an honest price. Now that the making of Aircraft is added to our other activities we intend by every means possible to maintain the reputation of that mark.

BOULTON & PAUL LTD.
Makers of Aircraft
NORWICH.
Telegrams: AVIATION, NORWICH.
Telephone: 851 NORWICH, 5 lines.


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY

Sterling

CASTINGS

"STERLING" Castings are made from metals scientifically prepared for the work for which they are intended. Each day's cast is carefully analysed and any deviation corrected. "Sterling" methods of moulding, coring up, and of gauging moulds and finished castings ensure a high average of accuracy.

Aluminium Crank Cases, Cylinders, Pistons;
Iron Cylinders, Pistons, Cylinder Liners;
Bronze, Phosphor, 42 Ton Manganese.

Sterling Metals, Ltd:
WIRE: "STERMET" COVENTRY
PHONE: COVENTRY 381
Coventry.

W. CANNING & Co.

Lustre Works,
Gt. Hampton Street.

AND 18/20, ST. JOHN'S SQUARE,
CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

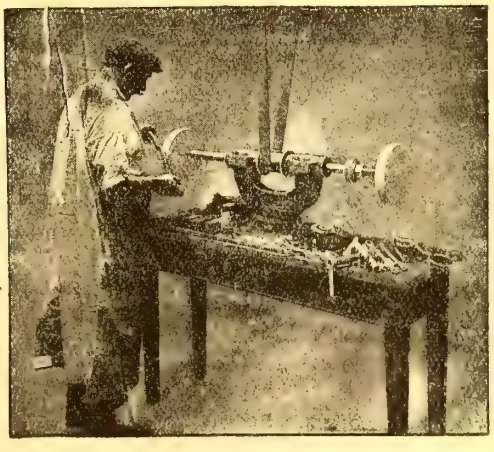


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Works: Blackhorse Lane, Walthamstow.

TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE-ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.

A. V. ROE & Co., Ltd.

Aeroplane Constructors.

NEWTON HEATH
MANCHESTER.

Telephones—
City 8530 and 8531.

Telegrams—Triplane.



HAMBLE,
near SOUTHAMPTON.

Telephone—
Hamble 18.

Telegrams—
Roe, Hamble.

AEROPLANES
AND
PARTS.



166, PICCADILLY,
LONDON, W.1.

Telephone—
Gerrard 3186.

Telegrams—
Senalpirt, Phone.

CODE: A.B.C.: 5th Edition.

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 3s. 10d. 6 months, 7s. 7d.; 12 months, 15s. 2d.
Foreign, 3 months, 5s. 0d; 6 months, 10s. 0d.; 12 months, 20s. 0d. Canada, 1 Year, $4.70c.
U.S.A., 1 Year, $5.20c.

ON THINGS BEHIND THE SCENES.

Amongst the soldiers this is muttered,
That here you maintain several factions;
And, whilst a field should be dispatch'd and fought,
You are disputing of your generals,
One would have lingering wars with little cost;
Another would fly swift, but wanteth wings;
A third thinks, without expense at all,
By guileful words peace may be obtain'd.

—*Henry VI.*

In a brilliant letter published in the "Morning Post" on April 10th, Lord Esher showed how in Wellington's time faint-hearted politicians, place-hunters, and intriguers for and on behalf of themselves or the King's enemies hampered the Armies in the field by their squabbling. By way of showing that even a hundred years and more ago such intrigues and treacheries were not new, Lord Esher quoted the wonderfully apt passage from *Henry VI* which appears at the head of this column.

The fact that Shakespeare should have put such words into the mouth of the Messenger to the War Office from the B.E.F., of 1422 A.D., shows that even at the end of the Sixteenth Century these things were not new, and were considered fitting to the early years of the Fifteenth Century.

The astonishing appositeness of the quotation at this particular moment is increased when one recalls the opening of the Messenger's speech to the assembly at Westminster:—

My honourable lords, health to you all!
Sad tidings bring I to you out of France,
Of loss, of slaughter, and discomfiture.

and his closing words:—

Awake, awake, English nobility!
Let not sloth dim your honours, new begot:
Cropp'd are the flower-de-luces in your arms;
Of England's coat one half is cut away.

Those who will take the trouble to read the first part of Shakespeare's play, entitled "King Henry VI," will find much more of a like nature, showing how we in this country have changed not at all since the days when the weak King Henry VI lost all that had been won by King Henry V at Agincourt. Then the intrigue and graft and treachery was carried on by territorial lords instead of by financial magnates and politicians. Truly history is the greatest plagiarist of all authors.

Union Which Is Not Strength.

We have been told, ever since, under pressure from that well-meaning but mistaken body the Parliamentary Air Committee, the weakest of our Premiers, Mr. George, decreed the unification of the two Flying Services into the Air Force, that union would mean strength, that removal of competition would prevent intrigue, and that perfect internal peace would permit the combined Air Force to meet all assaults with ease.

And the truth is that never since flying began has intrigue and jealousy been so great a danger to our strength in the air as it is to-day.

Some few days ago an amazingly fatuous circular was sent out to the press from some department of the Air Ministry, prating about the unity and brotherly love which would follow on the amalgamation of the staffs in the Hotel Cecil. It was said, for example, that by amalgamating two departments the best man in both would be available as chief of the combined single department. Only an utter innocent or an astounding hypocrite could have delivered himself of such a dictum.

The Hôtel Bolo.

It is not without reason that the Hotel Cecil has won for itself among Service people who, for their sins, have dealings in it the nickname of the "Hotel Bolo." The name was given long ago, before the passing of the lamentable Air Force Bill. The explanation given by the Service people themselves was that everybody in the place was either actively interfering with the progress of the war, or else was merely looking on as a neutral.

Naturally the statement was an exaggeration, as such jests are bound to be, but there was enough truth in it for the name to stick to such an extent that when other premises were commandeered in order to house the ever-growing staff of meddling and muddling officials the extensions of offices were duly labelled "Bolshevik Mansions," "Soviet Chambers," and finally, as a last blow, "Trotsky Rents."

The Beauties of Competition.

How this Utopian unification works in practice may best be understood from a simple illustration concerning a purely imaginary department.

Let us suppose a special department dealing exclusively with brass tacks, just as other departments deal with aero-engines, fabric for wing-coverings, dope, timber, etc.

In the old days the Brass Tack Dept. R.N.A.S. was in open competition with the B.T.D. R.F.C. Lieut. Jones, R.N.V.R., B.T.D. R.N.A.S., was all out to get the best possible brass tacks in the largest possible quantities for R.N.A.S. aeroplanes and seaplanes.

Capt. Smith, R.F.C., O.C., B.T.Dept., Royal Flying Corps, did likewise, but was probably hampered by the fact that the Royal Aircraft Factory's "experts" advised the Technical Dept. R.F.C. that tacks of duralumin or of manganese-bronze—with .004 per cent. of chromium as an added alloy—were preferable. Also probably the Aeronautical Inspection Dept. rejected 95 per cent. of his manganese-chromium-bronze tacks because the heads were two four-thousandths of an inch under or over size, and the radius from shank to head was not strictly to gauge.

Consequently Lieut. Jones, R.N.V.R., practically

made a corner in brass tacks, and when the R.F.C. found itself without any tacks at all with which to keep the fabric on its wings or the three-ply on its fuselages, it then went to the Air Board and begged that the Air Board would use its influence with the Admiralty to allow some of Lieut. Jones's brass tacks to be allocated to the R.F.C. And so the R.F.C. got what it wanted.—As a matter of cold plain history, something very like that actually accounted for the R.F.C. getting hold of a large supply of Sopwith "Pups" at a very critical moment in its affairs.

The Weakness of Union.

Now, however, we have a beautiful unified service. Lieut. Jones, R.N.V.R., becomes Capt. Jones, R.A.F. Capt. Smith, R.F.C., becomes Capt. Smith, R.A.F. The two Brass Tack Departments are amalgamated into one. Capt. Jones and his second and third in command are certain that they ought to run it, because they produced the brass tacks which saved both the Services in their hour of need. Capt. Smith and his subordinates are equally certain that they ought to run it, because they are used to handling the millions of forms invented by the A.I.D., and the Technical Dept., and the departments of the D.A.S., and the D.G.A.P. and the T.1 to T.*nth* departments, with which Capt. Jones, as a Lieut. R.N.V.R., never had to deal at all.

After all it is much more important to be able to fill up forms properly than it is merely to deliver the goods. At least so all Government Departments believe.

Anyhow, Capt. Jones and Capt. Smith, and all their subordinates, start out on a kind of electioneering campaign, all round the innumerable corridors and cubby-holes of the Hotel Bolo, to canvass for the help of those having influence with the High Authorities, to the end that their gang may be made chiefs of the B.T.D., R.A.F.—or of the B.T.D., Aeronautical Supplies Dept., Air Ministry, as one supposes it would be. This canvass, and the various squabbles involved, makes it impossible to fill in forms, or sanction contracts, or anything else.

And so all the Brass Tack Industry finds itself without orders from the Air Ministry, and turns its plant over to making a different type of brass tack, to the orders of the newly formed Ministry for Providing Furniture in Government Offices, or something of that sort which has been started to provide a well-paid job for one of Mr. George's friends, or for someone who happens to know rather too much about someone or other in or connected with the Government. As a humorous M.P. put it not long ago, the best way to get a good job is either to have a friend on the Front Bench in the House of Commons, or else to "know where the baby is buried."

However, to revert to Captains Jones and Smith, R.A.F., the net result of the unifying of their departments is that they and their staffs are so busy trying to avoid being pushed out of their cosy office over to a nasty place called France, where there is a war on, that the R.A.F. doesn't get its brass tacks. And as Shakespeare said:—

"'Another would fly swift, but wanteth wings."

Then probably the D.G.A.P. steps in, throws them both out, and appoints a capable business man to do the job. And the business man has to spend a solid six months learning his new work. After which he has to get the Brass Tack Industry back again to its old organisation for turning out aeroplane tacks instead of upholstery tacks.

In fine, we have abolished healthy competition between two Services, and have instituted a system in which internal disagreements absorb more energy than did the clean competition which existed before.

The Danger of Single Departments.

Even the cleverest man makes mistakes, so, quite apart from all these evils of intrigue and internal squabbling, there is the constant danger that a mistake in one department may land us without aeroplanes of the quality necessary to meet the enemy in the air with success.

The mere existence of an "opposite number" in a rival service was a kind of insurance policy against the danger of such mistakes.

Both the R.N.A.S. and the R.F.C. made the most astonishing blunders in the choice of machines and engines, but they never both made the same mistake at the same time. Consequently, one was always able to save the other from complete disaster. Under the present unified system the Technical Department is quite likely to turn down the very machine or engine which would save the situation. One has only to look at the mess which has been made of the supplies of timber and of linen fabric to see the danger of allowing any one department to handle either designs or supplies entirely by itself.

It is not even safe to have a single string of departments arranged in series, on the theory that when a design has passed by the Technical Department its defects may be discovered by the Supply Department or the Equipment Department. That merely means more and more delay in getting the design through. The only safe method is parallel departments actually in competition.

The Vital Necessity of Competition.

Even in operations the same argument holds good. It was the R.N.A.S. people at Dunkerque who developed the use of the big bombing machines for night work, and the smaller and faster bombers for day work. If it had been entirely in the hands of the R.F.C. people at home, everyone would still be bombing on Feeplanes and R.Es. simply because there would have been no "opposite number" to apply the spur of competition.

In fact, but for the spur of competition applied by the R.N.A.S. the R.F.C. would probably have nothing to-day except F.Es. and R.Es. and B.Es., for it was the R.N.A.S. which produced all the first Sopwiths, and Nieuports, and Handley-Pages, and le Rhônes, and Rolls-Royces in the field. The R.F.C. was thus spurred on to produce the later Bristols, de Havillands, and Martinsydes, and B.H.Ps., and so forth. The more one sees the more one is convinced that competition is vital to the welfare of the Flying Services.

ON DISPUTING OF OUR GENERALS.

To-day, at what is probably the real turning-point of the war, we find ourselves, as in the days of Henry VI, disputing of our generals. Again we are shown that this precious R.A.F. combination, so far from bringing unity, peace, and efficiency, has only brought additional intrigue, disunion, and discord.

On Sunday last everyone concerned with Service aviation was staggered by the announcement that Sir Hugh Trenchard had resigned the post of Chief of the Air Staff and that Major-General F. H. Sykes, C.M.G., had been appointed in his stead.

It has been known to all who have been at all closely in touch with affairs behind the scenes that intrigues between several different factions have been going on ever since the Air Ministry was formed, the objects of the intrigues being to put this, that, or the other

individual or faction into power. In fact it has been more more or less a case of Captain Jones *versus* Captain Smith all over again, only very much higher up.

Rumours and More Rumours.

It has been said that there was an intrigue among the soldiers to "out" Lord Rothermere. Also that there was a scheme among the older hands of the R.N.A.S. and R.F.C. to get rid of Lord Rothermere and Sir Henry Norman, and put in a soldier as Air Minister. Another yarn had it that another clique backed by Mr. Bonar Law was busy trying to get General Henderson made Air Minister. Yet another story said that the Navy people were out to capture the administrative control, and that the soldiers would resign if they did so:—Some colour was given to this story by the mysterious appointment of certain elderly Naval officers to high commands over big districts where their subordinates will all be experienced and energetic young soldiers to whom Naval notions of administration must be alien.

Another story again insisted that Lord Rothermere was going anyhow, that Sir Henry Norman was to take his place, and that all the Service people objected more or less unanimously. Still another story said that Sir Henry Norman had displayed remarkable ability and a wonderful grasp of the problems of Service aeronautics, and that many of the Service people were strongly in favour of his taking over complete control of the Air Ministry.

There were all the usual party cries that somebody must go. "Rothermere must go," because he cannot grasp the ideas or needs of aviators. "Henderson must go," because he is too closely connected with political people. "Norman must go," because he is too fond of interfering with the various interests, both civil and Service, of producers and users. "Trenchard must go," because he rides rough-shod over everybody else's ideas. And so forth and so on, *ad nauseam*.

The Evils of Intrigues.

It was all very paltry, very disgraceful, and above all very dangerous at this critical stage of affairs, for all these rumours dispersed outwards among the training brigades and the active service squadrons, and gave rise to a feeling of unrest and uncertainty at the very time when everyone should have been working at the highest pressure sustained by the feeling that all was well at Headquarters and that the people at home were concentrating their utmost energy on the needs of the people in the field. Instead of this feeling that all is well it has come about that:

"Amongst the soldiers this is muttered,
That here you maintain several factions
And, whilst a field should be dispatched and fought,
You are disputing of your generals."

Of General Trenchard.

So far it has not been made known what Sir Hugh Trenchard is to do, now that he has ceased to be C.A.S. Doubtless his next appointment will be announced in due course. He is too big a man to be quietly Stellenbosched, and he is too energetic a man to be kicked upstairs to oblivion by promotion to higher rank without a command.

Major-General Sir Hugh Montague Trenchard, K.C.B., D.S.O., was born on February 3rd, 1873. He entered the Royal Scots Fusiliers through the Militia in 1893, and became captain early in 1900. He had meantime seen service in South Africa with the Imperial Yeomanry, Bushmen's Corps, and afterwards with the Canadian Scouts. While serving with the latter he was dangerously wounded. In this war he qualified for the Queen's medal with three clasps and the King's medal with two clasps.

He became brevet major in 1902, and served with the West African Frontier Force between 1903 and 1910. Here he rose to be commandant of the North Nigerian Regiment in 1908, having previously been mentioned in dispatches and having gained the D.S.O. in 1906. With the West African Frontier Force he received a medal and three clasps.

Towards the end of 1912 he became Chief of Staff, with the grade of squadron commander, at the Central



THE MEN WHO DO THE WORK.—A group of fighting pilots and machine-gunners at the Front. Each of them is guaranteed to have brought down at least three Huns.

Flying School, Captain Godfrey Paine being Commandant, and was promoted a year later to assistant commandant.

At the outbreak of war in 1914 he became Commandant of the Military Wing R.F.C. In 1915 he was promoted, first, lieutenant-colonel (January 18th), then colonel (June 3rd), with, later, the temporary rank of brigadier-general.

He held this rank from August 25th, 1915, to March 23rd, 1916, when he became major-general (temp.).

In June, 1915, he became A.D.C. (extra) to the King and brigade commander a month later.

After a long period of distinguished service in France he became a member of the Air Council as Chief of the Air Staff when the Council was constituted last January, and has thus been intimately associated with the task, now, unfortunately, only too complete, of amalgamating the two Flying Services in the Royal Air Force.

General Trenchard made the R.F.C. what it is. By sheer magnetic personality and strength of character he held together the *moral* of the Corps in 1915 and 1916, when, thanks to General Henderson's disastrous error in staking the welfare of the Corps on the supply of aeroplanes and engines designed by the Royal Aircraft Factory, the Fokker and the Albatros machines in turn fairly dominated our aviators at the front. Even now we have not recovered from General Henderson's mistake, for we are landed with vast quantities of obsolete and obsolescent R.A.F. machines and engines as a result, when the same labour and material could have produced much greater numbers of much better aeroplanes.

Yet despite these drawbacks General Trenchard made the R.F.C. into the finest fighting machine in the world, not excepting even the German Army. He has made mistakes, as every other great man has made them. He has broken good men and he has promoted men who afterwards turned out to be failures. But such mistakes have been rare, compared with similar mistakes made by others.

His enemies—who are not a few—say that General Trenchard is a Bismarck, and uses Prussian methods. Those who know him best know that his kindness of heart is his greatest weakness. The fact remains that the R.F.C. in the field worship him, and that his appointment as Chief of the Air Staff was the one thing which gave the Corps hope for the future of that much disliked hermaphrodite affair which is called the R.A.F.

If General Trenchard leaves the R.A.F.—unless, that is to say, he can induce the Army Council to slap the faces of the politicians by reviving the R.F.C. as a purely military concern—the effect must be very grave.

The R.F.C. has full faith in General Salmond, who is a most capable commander in the field and an able administrator at home, but when the Corps sees its idolised Chief turned out at the bidding of politicians it is bound to wonder what is to be its own fate as a fighting force, and who among its leaders is to be safe against intrigues.

While such things are permitted, it is little wonder that belief grows in the existence of a Hidden Hand which grips the Government and compels the removal of any man who seems to be in danger of winning the war against the German friends of our politicians and international Jew financiers.

Of General Sykes.

General Sykes' will be a new name in these days to the great majority of Service aviators, yet he was one of the pioneers of Service aviation. He began his military career as a trooper in Lord Roberts' bodyguard in the South African war. Thence he obtained a commission in the 14th Hussars. He devoted himself to Staff work, and so has not held a command in the field as an Army officer.

His personal bravery is beyond dispute, as those who served with him in India can vouchsafe. He is credited with being one of the only two or three men who have ever walked from Pekin to Simla, via Tibet and the Himalayas—or by any other route, for that matter. He learned to fly on a Bristol biplane at Brooklands in 1911, his certificate being No. 95, dated June 6th, 1911, and though never claiming to be among the first-class pilots he has probably done vastly more flying as a pilot than anyone of his rank, except one major-general of the R.A.F. He did practically all the organisation work of the R.F.C., and commanded the Military Wing of that corps until the outbreak of war, when General Henderson took command in the field.

He went to France with the R.F.C. in 1914, as Chief of Staff to General Henderson, and it is said that he and his chief were by no means unanimous. Therefore it seems unlikely that his appointment as C.A.S. was made by General Henderson's political friends. It has, however, been rumoured for some time that General Sykes was coming back to aviation with greatly increased powers, though no hint was given as to the precise post.

In May, 1915, as a lieutenant-colonel in the Army, he went to the Eastern Mediterranean to report on the air work of the R.N.A.S., which at the time was fairly futile, thanks chiefly to mishandling of *matériel* and designs in the Air Department of the Admiralty. As the result of this report Colonel Sykes was appointed Colonel-Commandant Royal Marines, and Wing-Captain R.N.A.S., and was placed in command of all units of the Flying Services with the Mediterranean Expeditionary Force.

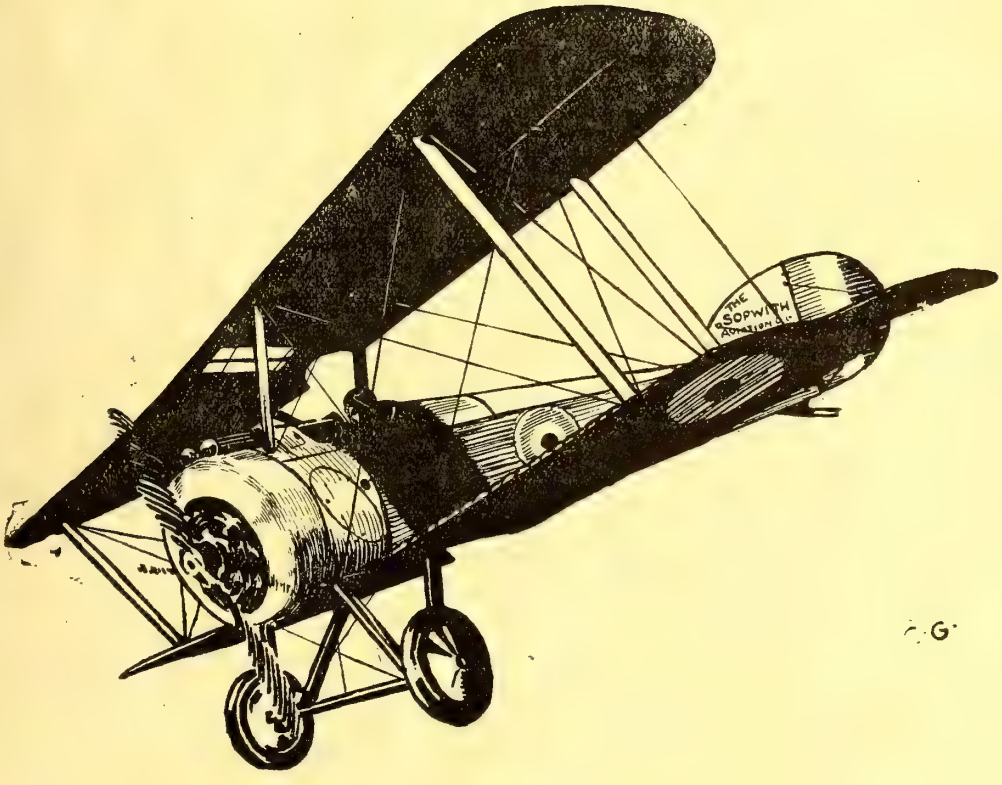
He held this command till the evacuation of Gallipoli in 1916, when he severed his connection with aeronautical affairs. Since leaving the R.N.A.S. General Sykes has been a Deputy Director of Organisation at the War Office, and of late he has been a member of the Supreme War Council at Versailles.

It is said by those who served with him that as an organiser he is altogether excellent. As a commander of men it is said by those who did not agree with him that he was too secretive, and that, by keeping his plans and theories and ideas too much to himself, he failed to arouse that enthusiasm and *esprit de corps* which is so necessary in business of this nature.

Nevertheless, General Sykes has the faculty of inspiring strong personal regard, and of getting a vast amount of good work out of his subordinates. He has an unlimited capacity for hard work, and never expects a subordinate to do more than he does himself. Moreover, he is quick to recognise and acknowledge keenness in others. Therefore one may regard his appointment as likely to maintain to the fullest degree the efficiency of the Air Force in so far as the organising work of the Chief of the Air Staff affects it.

Those who were closely in touch with General Sykes in the early days of the R.F.C. always speak of him as an officer of great foresight, and as possessing that gift of imagination which leads to the forming of new plans in time to forestall the enemy. These, at the present moment, are qualities which may well be of very high value to the Royal Air Force. Those who were concerned with military aeronautics before the war will recall certain lectures and remarks by Major Sykes, as he then was, at meetings of the Aeronautical Society, which displayed his foresight, and one may safely say that if the *matériel* of the R.F.C. had been developed along the lines which he then laid down, the Corps would have been saved many of the losses which it has

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

SBAC

Paris Office:
21, RUE DU MONT THABOR.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

suffered during the war, and would have done even better work than it has done. At any rate, he will have the good wishes of all old-timers in his new task.

Of Sir Henry Norman.

The reason for Sir Henry Norman's appointment to the Air Ministry has not yet been disclosed. Nor has the reason for his visit to Germany on wireless affairs before the war been made public. Nevertheless, those in touch with the work of the Air Ministry are disposed to regard him as a distinct acquisition.

As a man of considerable means, he is not likely to be influenced by the desire for personal gain, as are so many politicians. As he inherited his wealth and did not make it himself, one may accept him as one who has come by his money honestly. And, incidentally, he is a gentleman by descent, which is somewhat unusual in political life in these days.

He is known as a man of considerable scientific knowledge, which he has acquired as an amateur and not under the necessity of making a living. Therefore his judgment is not likely to be biased by running in a groove, nor warped by too close an adherence to one side of a subject.

It is said that he has already gained quite a useful knowledge of practical aeronautics, as well as of the internal politics of aviation, so that, despite his short connection with the Air Ministry, he is far better qualified to deal with aeronautical matters than is anyone who has hitherto held a political appointment.

What may be Sir Henry Norman's ultimate goal in the Air Ministry one has not the faintest idea. Being a gentleman of means, and not a self-seeking politician, it is even possible that his goal may be simply the achievement of the highest efficiency and the best possible equipment in the Air Force. In such case he deserves well of the commonwealth.

ON A FIELD THAT SHOULD BE DISPATCHED.

Of the R.A.F. one may say that up to the present its sponsors, promoters, or whatever they like to call themselves, have arrived just so far as the mental point at which Mr. Pemberton-Billing had arrived in 1915, before he left a comfortable job and certain promotion in the R.N.A.S. to fight for a seat in Parliament and political martyrdom. He, at that time, believed in a single Imperial Air Service, under one big, strong man: a Service which would tell off individuals for sea, land, and air operations as requisite, drawing them all from a common pool. For all his war experience, as exemplified by his South African medal with its many bars, and his three mentions in dispatches in South Africa, and his clever organisation and carrying out of the raid on Friedrichshafen, and his consequent recommendation for the D.S.O. and Legion of Honour, and his letters of thanks from the Authorities, Mr. Pemberton-Billing's enthusiasm for flying led him to see the matter too narrowly at first.

Later on, very soon after he entered Parliament, and after many long arguments with people concerned with and for the Services, he came to the same conclusion as that which had always been maintained in this paper, namely, that a sailor is a sailor, and a soldier is a soldier, and that to achieve the highest efficiency the R.N.A.S. should be a part of the Navy, the R.F.C. should be a part of the Army, and that the Imperial Air Force—or R.A.F. if one pleases—should be kept entirely for air operations, such as bombing and air fighting, outside the operations of the Navy and Army.

So far as this common-sense conclusion our High Authorities have not yet attained. They have not even reached the point of splitting the Royal Air Force into three distinct wings, and giving separate existence to the Naval, Military, and Air Force people. At present the Force is a kind of conglommerate Trinity in which the personnel is as hopelessly muddled as it is in the Athanasian Creed.

None the less one is certain that, sooner or later—provided always that the British people are true to their King and themselves, and do not let the politicians sell them to the Germans, either for money or under fear of blackmail—the three Services must separate out, simply because an aeroplane or an airship is merely a vehicle, like a boat, or a motor-car, or a train, which carries a sailor or a soldier or an air-fighter upon his lawful occasions.

A New R.N.A.S.

It is already freely said that the Admiralty will before long take the R.N.A.S. back to the Navy's bosom, and that if it refuses to come back the Navy will start a new Air Service of its own. The sooner it does so the better, if half one hears is true about the abolition of seaplanes and flying boats because, forsooth, engines are now supposed to be so reliable that land machines can fly safely on sea patrols.

Years before the war this paper consistently pointed out that slightly modified land machines could be catapulted off the decks of ships. In fact, the first aeroplane in this country to alight on water flew off the deck of a ship. Also poor little Pégoud showed how easy it was for an aeroplane to hitch itself onto a wire when returning to a ship. Consequently one may easily obtain wrong ideas about the functions of seaplanes and seaplane carriers.

Therefore it is well to remember that there is not much chance for seaplane-carrying surface-ships when the water is full of submarines and the air is full of torpedo-seaplanes. Nor is there much use even for the ingenious seaplane-carrying submarine which Mr. Pemberton-Billing devised some years ago, when he was merely an aircraft manufacturer and not a social reformer, provided there are a few good, big sea-going flying-boats in the vicinity.

Consequently it becomes more and more obvious, if people will only take the trouble to think, that seaplanes, big and small, are the Navy's job and that no other Service has any business with them.

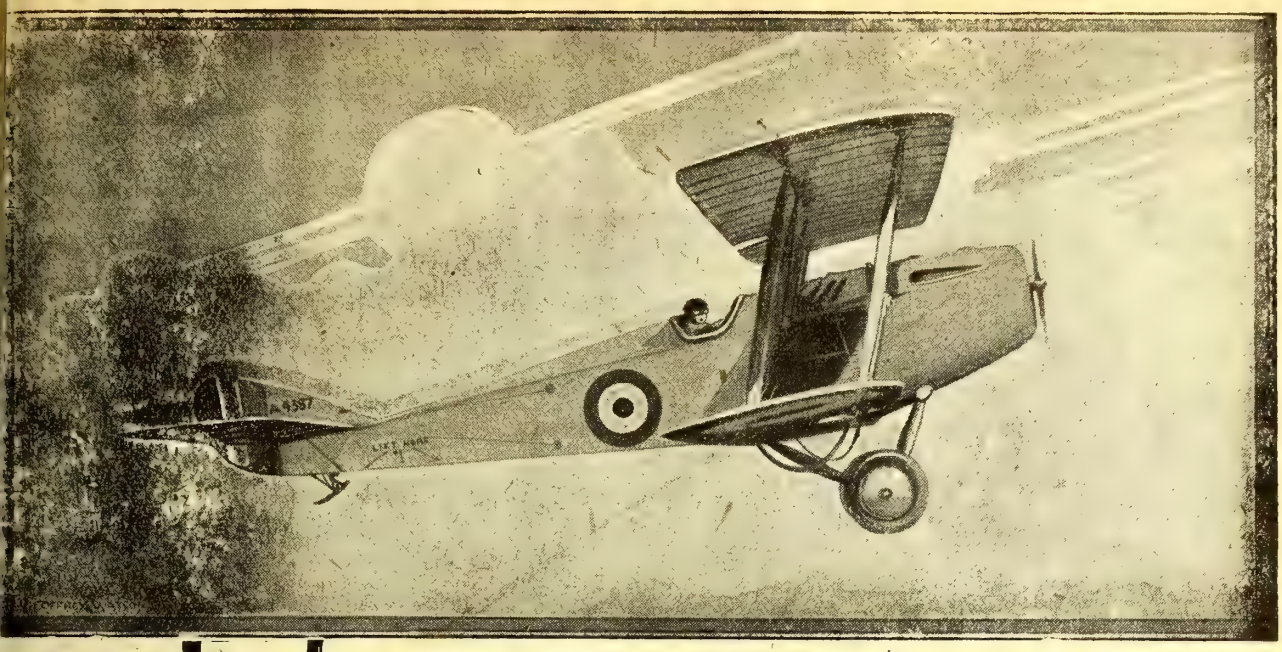
A New R.F.C. and R.A.F.

Similarly it is obvious that Army reconnaissance, photography, tactical bombing, infantry contact, and artillery observation are jobs for trained soldiers. Ground strafing may be anybody's job. Even seaplanes may take a hand in it at a pinch, as they have done in the Eastern Mediterranean and in Belgium. But the other work is the Army's affair.

Hun-stalking in the higher altitudes, and "dog-fights" in and around the ten and twelve thousand-foot levels, are more or less pure Air Force work, for those skilled air-fighters who are pleased to call themselves, in their grimly humorous way, "hired assassins" need have no military training. The long-range, or strategic, bombers need even less approximation to the manners, customs, and technical education of the Army.

If we are to make our Air Power supreme—as, before the war, we assumed our Sea Power to be supreme—these matters must be handled with intelligence.

"Lingering wars with little cost" cannot be carried on in the air. They were always the most expensive in the end, even on land or sea, as Shakespeare—or Bacon—well knew when he put those bitterly sarcastic words into the mouth of the Messenger from the British





MARTINSYDE

Aerodrome and Auxiliary Works:
BROOKLANDS.

Head Office & Works:
WOKING, Surrey.

Expeditionary Force which, under Lord Talbot, had been defeated in France at the opening of the reign of Henry VI.

He who "thinks without expense at all by guileful words peace may be obtain'd" is the same kind of monumental fool as our own Pacifists, or the Russian revolutionaries who deposed his Imperial Majesty the Tsar. Such an one would merely hand the country over, first of all to Bolshevism, and ultimately to the enemy.

He who "would fly swift, but wanteth wings," is the only one who thinks on the right lines. It is the task of the Air Ministry, and of all of us, to see that those wings are no longer wanting, and shall never be wanting in the future. Thus, and thus only, shall the muttering among the soldiers cease.—C. G. G.

THE NEW CHIEF OF THE AIR STAFF.

The Secretary of the Air Ministry forwarded the following notice to certain newspapers for publication on April 15th:—

His Majesty the King has been pleased to appoint Major-General F. H. Sykes, C.M.G., to be Chief of the Air Staff, Royal Air Force, on the resignation of Major-General Sir Hugh Trenchard, K.C.B., D.S.O.

THE OFFICIAL REASON.

On April 15th, Major J. L. Baird, the Parliamentary Secretary to the Air Ministry, replying to Mr. W. Joynson-Hicks, said that the resignation of Major-General Trenchard resulted from the fact that he took a view as to the powers and duties of the Chief of the Air Staff which the Secretary of State of the Royal Air Force could not accept.

He was authorised by the Secretary of State to say that personally he yielded to nobody in appreciation of Major-General Trenchard's high qualities, and much regretted that a difference of opinion on a point of principle should have arisen.

[The fact that General Trenchard has "made good" under the most adverse circumstances will incline all who have the safety of the Nation at heart to back his opinion against that of any civilian appointed by Mr. George. Sir Hugh's removal is the most fatal thing that can possibly happen, and at this particular time the change is absolutely criminal.

General Trenchard is too straight a man to suffer gladly these politicians, whose aim in life seems to be thinking out ways of losing the war as quickly as possible. Everyone who has anything to do with military aviation knows that General Trenchard is the only man who knows the job and who has the power and driving force to get things done. Both Services know him and trust him implicitly. All the country knows our politicians and distrusts them absolutely.—C. G. G.]

A WAY OUT.

The simplest way out of all the present disastrous squabbling over the affairs of the air seems to be for the Admiralty to revive the Royal Naval Air Service on its own account, and for the Army Council to revive the Royal Flying Corps as a purely military concern.

Officers and men of the R.N.A.S. and of the R.F.C. have, under the Air Force Act, the right to resign from the R.A.F. any time within three months from the first of April. If the Navy and Army act promptly, they can thus secure the pick of the personnel of both the Flying Services for their own separate aerial uses, leaving the rest for the Royal Air Force.

If the Aircraft Production Department of the Ministry of Munitions is so much under the influence of the Air Minister as to refuse to supply the necessary seaplanes to the Navy, and military aeroplanes to the Army, then it would be simple for the Navy to build its own machines in its dockyards, and for the Army to build its machines at Woolwich Arsenal, or at other purely military establishments.—C. G. G.

MORE RESIGNATIONS.

As this paper goes to press it is stated that Sir Godfrey Paine and Sir David Henderson have also resigned from the Air Council as a protest against the removal of Sir Hugh Trenchard, and that they have been allowed to go.

LORD ROTHERMERE'S VIEW.

Lord Rothermere has addressed the following letter to Colonel Faber, M.P. As some of his views are open to argument it has seemed well to insert comments where necessary:—

April 14th, 1918.

Dear Colonel Faber,—Regarding your call upon me last week, and your subsequent letter, I wish to assure you that the subjects we discussed are having my most earnest attention.

It is true that the number of Staff officers in the Home organisation of the Flying Service is nearly as great as the number of active airmen on the fighting fronts. It is deplorable, but I am not responsible for the system which engenders such a multiplicity of Staff appointments.

[The number of Staff appointments at the Air Ministry is due to the inefficiency of the whole Government system. The so-called Staff officers are not officers at all, but merely clerks in uniform. In actual fact the number of *pukka* officers employed on real Staff work is very small.]

A swollen organisation always means inefficient administration, but it is to be said for the present system that hastily improvised arrangements made in war time must always be somewhat cumbrous and will always leave plenty of room for criticism. There is much duplication, and a great many of these most excellent officers are engaged in filling up unnecessary forms and carrying out circumlocutory methods of conducting business.

Of course, the Hotel Cecil does not lend itself to efficient organisation. It is, as you know, a vast building with a multitude of small rooms. Supervision is difficult, and there is necessarily much interchange of correspondence which could be avoided if the Staff were accommodated in a building with a small number of very large rooms. However, I am afraid there is no remedy here, because it is impossible to obtain more serviceable premises.

Above all things, the Air Force needs a real Strategic Staff. Almost every move of the enemy on the front brings into existence some new aerial problem which requires instant examination and consideration. A small Strategic Council is now being formed, the members of which will be selected for their knowledge of aerial warfare and for their capacity to envisage some of the aerial problems which the coming months and years will force to the front.

[Hitherto there has been no need for a Strategic Staff, for the supply of machines has been inadequate for the Army's tactical work, and Naval strategy does not exist. If the Army's needs are now filled, then perhaps it may be possible to think of Air strategy. However, Lord Rothermere's reference to the enemy's moves on the front seems to pertain rather to tactics than to strategy; perhaps he is confusing the meanings of the two words, as so many journalists do. A Strategic Council on air warfare without General Trenchard seems rather like "Hamlet" without the Prince of Denmark, for there is none with so deep and wide a knowledge of the subject.]

I intend that the door shall be thrown wide open for promotion of any and every officer whose merit first from the disciplinary, and then from the flying or technical, point of view, entitles him to advancement. The Regular officer must always receive priority of consideration.

[This, at any rate, is a thoroughly sound rule.]

He is the backbone of the three fighting Services, but after all his claims have been met there should be wide scope for the promotion of Temporary and Special Reserve officers, for in the Air Force these officers comprise more than 90 per cent. of the entire staff. So far not one of them has risen to the rank of Brigadier-General on any of the battle fronts or in the training divisions at home.

[There seems no reason why any of the temporary officers should so have risen. They are all young men without military experience who joined merely as pilots. Many S.R. officers are Lieut.-Colonels, and one at least has been a Brigadier—so that Lord Rothermere is wrong in his facts. And a Territorial officer has done excellent Staff work as a Brigadier. In fact promotion in the R.F.C. has been very just, and as a rule very successful. One only hopes that some of the queer new appointments in the R.A.F. will prove to have been half as well judged.]

In regard to Staff appointments, I think that in the hurry of getting things done not sufficient consideration was paid, when selections were being made to the Home Staff, to the claims of wounded and incapacitated airmen. In future, when an appointment is to be made, war service will count first.

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

— CONTRACTORS TO —

H.M. AIR FORCES.

Telegrams:
"AVIATION, BRISTOL."

Telephones:
3906 BRISTOL
(Private Branch Exchange)

[One hopes that the claims of "incapacitated airmen" will not receive undue consideration. If a man is suffering from the effects of a wound or a crash, especially if his nerve is affected, he is the last man in the world to be fit for the mental strain and constant worry of Staff work. An office full of invalids does thoroughly bad work or none at all. It has been tried, and it has been found to be the worst form of false economy. It is cheaper and kinder to pay these officers to keep away from the office, except in the cases of trained Staff Officers.]

There is the other matter we discussed, which is of urgent importance, but which I would rather not further refer to in my letter. I recognise its gravity, and am taking immediate measures. It is a matter which, fortunately, concerns the Home organisation, and is therefore capable of direct handling. It has caused me a great deal of anxiety, and I am fully aware of my profound responsibility. I have received many letters on the subject.

You may be disappointed with my letter. War, however, is not the time to make charges, and for my part, whatever counsels are urged upon me, I cannot—as in the past, so in the future—act except after the most deliberate consideration, and then only with the most meticulous care.

Yours faithfully, ROTHERMERE.

ANOTHER AIR MINISTRY APPOINTMENT.

The Secretary of State for the Royal Air Force has appointed Brigadier-General Guy Livingston, C.M.G., to be Air Secretary to the Secretary of State, combining the duties with those of his appointment as Deputy-Master General of Personnel in the Air Ministry.

MORE AIR FORCE APPOINTMENTS.

A writer in the "Evening News" of April 15th says:—

"I hear that Maj.-Gen. F. C. Heath-Caldwell, C.B., is appointed for the flying command in the London district; Maj.-Gen. the Hon. Sir Frederick Gordon, K.C.B., D.S.O., to the York district; Maj.-Gen. M. E. F. Kerr, C.B., M.V.O., to the Salisbury district; Brig.-Gen. J. F. A. Higgins, D.S.O., to the Birmingham district; and Maj.-Gen. G. C. Caley, C.B., to the Glasgow district.

"Maj.-Gen. Heath-Caldwell was born in 1858, entered the Royal Engineers in 1877, and serveed in Egypt, the Soudan, and South Africa.

"Maj.-Gen. the Hon. Sir Frederick Gordon is the fourth son of the late Lord Gordon. He was born in 1861, and was in the battles of Tel-el-Kebir, El Teb, Tamai, and in the South African campaign. He has already been mentioned five times in this war.

"Maj.-Gen. Kerr served in the Egyptian and Soudan campaigns. He has the Royal Humane Society's medal for saving life at sea. He holds many honours from European Sovereigns. He took the flying certificate of the Royal Aero Club in July, 1914. He has published books and essays on Nelson, also on flying."

[Gen. Kerr is better known as Rear-Admiral Mark Kerr, R.N., and Gen. Caley as Commander Caley, R.N. As this information appears in the Harmsworth Press it is probably "straight from the horse's mouth," and it has probably been passed by the Censor. Otherwise one would hesitate to make public information which has not been published officially.—Ed.]

AN OFFICIAL EXPLANATION.

It was announced by the Press Bureau on April 15th that, owing to the peculiar circumstances in which the Royal Air Force has been formed while active operations are in progress, the number of senior officers in the Force has been found insufficient to provide for the administration and command of the large forces at home which have been transferred from the Navy and Army. Certain officers of high rank have therefore been temporarily lent to the Air Force by the Admiralty and Army Council to carry out these duties.

[This is precisely the kind of explanation which it was suggested in THE AEROPLANE of April 10th ought to be sent out to allay ill-feeling in the R.A.F.—Ed.]

A PRODUCTION APPOINTMENT.

Mr. Alan E. L. Chorlton, C.B.E., has been appointed Assistant Controller of the Department of Aircraft Production, to deal with the supply and production of aero engines, excluding Rolls-Royce engines.

Alan Ernest Leofric Chorlton, C.B.E., M.Inst.C.E., M.I.Mech.E., M.I.E.E., is also a Member of the Institute of Automobile Engineers, an Associate Fellow of the Aeronautical Society, a Member of the American Society of Mechanical Engineers, a Member of the Board of Inventions and Research, a Member of the Financial Committee of the Ministry of Reconstruction, a Member of the Civil Aerial Transport Committee, a Member of the Agricultural Engineering Sub-Committee of the Royal Society, and a Member of the Technical Committee of the Motor Industries.

He has been released by Ruston Proctor & Co., Ltd., of Lincoln, to join the Air Board. For some time past he had occupied the chief engineering post with that firm, where he organised a remarkable output of engines and aeroplanes combined.

For many years he has been closely associated with internal combustion engines, in connection with which he has produced many inventions, more particularly referring to large gas and heavy-oil engines, on which subjects he is a recognised authority of substantial reputation. He has contributed many papers to various institutions on internal combustion engines and pumps, particularly turbine pumps, as well as on works management and agricultural oil tractors.

He has on several occasions given evidence before Royal Commissions on engineering matters. He has lived and travelled in Russia, and has visited engine works in Germany for fifteen years, up to the outbreak of war, with a view of keeping up to date in connection with internal combustion engine matters. Therefore, one is justified in expecting great things from his advent to the Aircraft Production Department.

AIR FORCE PROCEDURE.

A regulation made by the Air Council states that in the case of an officer transferred from the naval or military forces to the Air Force the time during which he has held a commission in the force from which he is transferred shall, for the purpose of qualifying such an officer as president or member of a court martial, be aggregated with the time during which he has held a commission in the Air Force

* * *

An order is gazetted authorising general and field officers of the Royal Air Force to issue billeting requisitions.

AIR FORCE RANKS.

Various second lieutenants of the R.F.C. who apparently have not seen or at any rate have not read Air Force Memorandum No. 1 seem to be in doubt as to their rank in the Air Force. It is perfectly clear from appendices 1b and 1c that flying officers second lieutenant or lieutenant and flying officer observers second lieutenant or lieutenant come into the Air Force as lieutenant at 12s. a day, with 1s. a day additional for each completed year's service. When entitled to draw flying pay they do so at the rate of 8s. per day.

AIRCRAFT IN THE HOUSE.

On April 9th **Mr. Lloyd George**, in the course of his speech on the recent retreat in France, made the following references concerning aircraft:—

Owing to the growth of the strength of our Armies in 1917, when this battle began the combatant strength of the whole of the German Army on the Western front was only, approximately, though not quite, equal to the total combatant strength of the Allies. In infantry they were slightly inferior, in artillery they were inferior, in cavalry they were considerably inferior, and, what is very important, they were undoubtedly inferior in aircraft.

The Germans had, however, one or two important advantages. The first, the initial, advantage, which is always commanded by the offensive, is that they know where they mean to attack—they choose the ground, they choose the location, they know the width of the attack, they know the dimensions of the attack, they know the time of the attack, and they know the method of the attack. All that invariably gives an initial advantage to an offensive. The defence has a general advantage. Owing to air observation concealment is difficult. At the same time, in spite of all that, owing to the power of moving troops at night, which the Germans exercised to a very large extent, there is a large margin for surprise even in spite of air observation, and of this the enemy took full advantage.

Our aircraft strength is greater now than before the battle, and we all know what brilliant service our airmen have rendered in this battle. (Cheers.) Until the whole story of the battle is told it would be almost impossible for us to estimate the services they have rendered in retarding the advance of the enemy, in destroying his machinery, and in making it difficult for him to bring up his guns and ammunition. We feel confident that our armies, generals, and soldiers will be quite equal to the next encounter whenever it comes.

COMPARATIVE OUTPUTS.

Mr. F. Kellaway, Parliamentary Secretary to the Ministry of Munitions, outlined the progress made in the production of munitions in an address to the Bedford Women's Liberal Association on April 11th.

The increase for the first two months of the year compared with the first two months of 1917 was as follows: aeroplanes, 223 per cent.; aero-engines, 245 per cent.

The average weekly production of aeroplanes for this year equalled the average production for two months in 1915.

[Provided that Mr. Kellaway has not been doped with faked figures the results seem quite satisfactory.—Ed.]

SAUNDERS OF COWES



FOR nearly 90 years the firm of SAUNDERS has been established on the Thames and at Cowes, Isle of Wight. They have long been known as constructors of fast power boats, and are holders of all the world's records for speed.

¶ They are also pioneers in the design and construction of the *first successful Flying Boats in this Country*, which were taken over by the Navy *two years before the War*.

S. E. SAUNDERS LTD.,

Head Office and Productive Works: East Cowes, I. of W.
Erecting and Testing: Solent Yard, Cowes *and* Osborne Works, East Cowes, *for Seaplanes; for land machines:* West Medina Aerodrome, East Cowes.

Telegrams: Consuta.



'Phone: Cowes 193 (4 lines)

AIR FORCE MEMORANDUM NO. 4.

INITIAL ARRANGEMENTS WITH AIR FORCE AGENTS FOR THE ISSUE OF PAY AND ALLOWANCES OF OFFICERS, AND FOR THE TRANSFER FROM ADVANCE PAYMENT TO PAYMENT IN ARREAR.

NOTE.—These notes are issued in amplification of the information already given in the Air Force Memorandum No. 1. They relate to the transition only. The standing procedure for the issue of pay and allowances of Officers of the Royal Air Force is given in F.S. Publication No. 5.

1. On the formation of the Air Force the pay of all officers will be issued monthly in arrear. The change from payment in advance in the case of officers at present serving with the Army will take effect from the outset, and the first monthly issue of pay will accordingly be made to *all* officers on the last day of the month in which the transfer takes place.

2. Following the general practice of the Army, payment will in all cases be made through duly appointed Air Force agents, as follows :—

(*a*) Staff, Flying and Observer Officers,
through Messrs, Cox and Co.,
109-111, St. Martin's Lane,
London, W.C.2.*

(*b*) Technical and Administrative Officers,
through Messrs. Holt and Co.,
3, Whitehall Place,
London, S.W.1.

These agents will be authorised to credit each officer at the end of each month with the amount of pay due, including flying pay, and technical pay. The agents through whom an officer receives his pay will—

(*a*) Accept his instructions as to how the amount is to be dealt with, and

(*b*) Be prepared to carry out the functions of banker and agent for the officer, if so desired.

3. It will be clearly understood that Air Force officers are perfectly free to keep their banking accounts with any banker they may select, and it will be open to them to instruct the agents to remit their credits regularly to any other banker, if they so prefer. All officers whose agents are now changed (paragraph 2), or for whom an agent is now being appointed for the first time, must instruct their agents at once as to this, and commanding officers of all units of the existing Flying Services should take immediate steps to see that this is done. The agents are themselves addressing a circular on the subject to all officers concerned. In the case of units in the United Kingdom, instructions should reach the agents on or before March 31st, if possible. (No action under this paragraph is necessary on the part of officers of the R.F.C., whose pay is, *and will continue to be*, issued by Messrs. Cox and Co., under paragraph 2 above.)

4. In order to meet any inconvenience which may be caused to an officer transferring from advance payment to payment in arrear, the agents have been instructed to make an advance (after the date of transfer) to any such officer, at his request, up to the extent of one month's pay. This advance will be made free of interest, and will be recoverable within six months; as a general rule officers may find it desirable to arrange to refund the advance by monthly abatements from pay.

Certain officers who will be entitled in ordinary course to a gratuity payable on discharge, under the existing pay regulations for the Army, may have the amount of the advance charged against the final gratuity if they signify to the agents that this is their desire, and in these cases no recovery of the advance will be required.

Requests for an advance under this paragraph should be made to the appropriate agent at once.

Officers transferred from the Royal Naval Air Service are not affected by this paragraph.

5. In cases where increased rates of pay will be due on transfer to the Air Force, these rates will, as far as possible, be issued from the commencement. In some cases, however, the full increase cannot be given pending individual assessment; *e.g.*, in the case of technical officers (especially of those coming from the Navy), the service pay of the rank will be given plus the minimum rate of technical pay, 2s., unless the existing pay of the officer is already higher.

6. The normal rule for Royal Air Force Officers serving in H.M. ships will be that they may receive payment from the R.N. paymaster in return for cheques drawn on their agents or

* Special note should be taken of the new premises which Messrs. Cox and Co. have opened for the Air Force.



An official photograph of a British fighting pilot and his armament. The Lewis Gun on top may be seen connected with the telescope-sight below. The curious-looking rings on the upper plane are merely the usual aileron levers of the Nieuport biplanes, and are not some new form of frightfulness. The tube which operates these levers is seen in front of the ∧ -shaped centre struts, and at this angle look like a strut to the muzzle of the Lewis Gun.

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines like Rolls-Royce Cars are the Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC

ROLLS-ROYCE

bankers up to certain limits. Similarly, officers serving with an expeditionary force may draw pay from field cashiers in return for cheques on the agents under the conditions laid down by the War Office for Army officers. As it will not be possible for such officers at the more distant stations to instruct their agents as in paragraphs 3 and 4 for some short time after the creation of the Air Force, the transition procedure in their case will be as follows :—

All officers whose agents are changed, or for whom an agent is now being appointed for the first time, will instruct their new agent as in paragraph 3, as early as practicable. They will meantime obtain any necessary cash locally in the manner just stated.

As regards the advance referred to in paragraph 4, the agents will be instructed to assume in such cases that the advance is desired, until the officer's wishes are known. Officers transferred from the Royal Navy who, subsequent to the date of transfer, may have received from a Naval paymaster advances on account of their pay according to Navy practice, should liquidate these advances in due course by giving the paymaster a cheque drawn on their agent or banker.

7. Children's allowance to officers eligible for the allowance will be credited through the Air Force agents concurrently with (and in the same manner as) pay, and will be dealt with in accordance with the officer's instructions to the agents.

All other allowances will be claimed through the Commanding Officer of the unit to which the officer belongs, in accordance with the instructions referred to in the prefatory note to this leaflet. These allowances, when passed for payment, will be issued through the agents in the same way as pay.

8. Any claims for allowances which may be outstanding in respect of service prior to the date of transfer should, however, be forwarded to the usual Admiralty or War Office paying officer, and as far as possible should be rendered before the formation of the Air Force.

Air Ministry, March 21st, 1918.

R.N.V.R. OFFICERS' PAY AND ALLOWANCES.

Among the various little matters which still remain to be adjusted so that officers of both Services may come into the R.A.F. under absolutely fair conditions the question of pay and special allowances to R.N.V.R. officers demands attention.

A lieutenant, R.N.V.R., receives approximately £275 per annum which is rather less than one would pay to a first-class mechanic in a workshop in these days, and is, of course, only about half what a really clever piece-worker can earn in many of the heavy engineering trades.

When the R.N.V.R. lieutenant attains to the proud dignity of Lieut.-Commander, and ships his extra half stripe, he receives no more pay, and his special allowance of something like £2 per month for each of his children is reduced by half, apparently on the theory that in order to uphold the proud position of a two-and-a-half-striper R.N.V.R. a man must be an independent gentleman of considerable means, who therefore does not require what is commonly known as "kid allowance."

The assumption that all R.N.V.R. officers are well-to-do is confirmed by the fact that the kit allowance for an R.N.V.R. officer on joining is £15, which of course just about pays for his boots and overcoats.

Now when these officers turn over to the R.A.F. they will have to obtain a complete new kit, even down to their boots and socks. Apparently the only articles of their clothing which will be wearable in the R.A.F. will be their underclothes and ties.

It is true that they are supposed to be allowed to wear out existing uniforms, but this is in fact not very helpful because an officer naturally renews his uniform as required, piece by piece, buying perhaps a new overcoat at one time, or a new jacket at another, whereas in the case of all the officers dressed in blue when once they have to get into khaki they will have to buy everything new at the same time, which on the very lowest estimate will entail the outlay of about £40. It will be interesting to know how the Authorities expect a man to lay out £40 or £50 in a new kit, maintain himself as befits an officer and gentleman on the balance of his £275, possibly having to support a wife and family at the same time, and still remain honest.

The case of the R.F.C. Equipment Officer, 1st Class, who is doing the same job as the two striper R.N.V.R. is very different. In the first place, his pay is about £450 per annum. In the second place, on joining, he was given a kit allowance of something between £35 and £50, and when he ultimately has to change his Army uniform for the costume of the R.A.F. he will have to buy comparatively few new things. His Field Service jacket may be altered into an R.A.F. tunic; he has to buy a new cap, poor wretch, but all his other clothing, boots, puttees, breeches, overcoats, shirts, collars, etc., remain the same, with the exception of his ties.

This means that the officer in blue who has been very much worse paid for doing exactly the same work and has originally been given a very much smaller kit allowance, and who after two or three years' Service is obviously several hundred pounds worse off than the R.F.C. Equipment Officer, is put to a very much greater expense in changing over. It seems therefore that purely as a matter of fair play the High Authorities should make some special allowance to R.N.V.R. officers who are taken over by the Air Force.

One knows of cases in which the work of one R.N.V.R. two striper or two-and-a-half striper would in the R.F.C. be divided up between at least three First-Class Equipment Officers, and there are even cases in which an R.N.V.R. two-and-a-half striper, on his 15s. a day or so, is dealing with contracts running into many hundreds of thousands of pounds per annum, while his actual subordinates, being technical officers, draw pay at the rate of several hundreds of pounds per annum more.

There are cases in which gentlemen have given up jobs worth £1,000 a year or more, on what would by now be profitable Government contracts, in order to take this paltry R.N.V.R. stipend and serve their country. It is equally true that the R.N.V.R. uniform in the case of some of those who are now officers of the R.A.F. covers gross instances of trench-dodging.

One therefore suggests that it would be very much for the good of the R.A.F. if those in high places were to investigate the circumstances under which all R.N.V.R. officers joined the Air Force in the first place, and if they were then to arrange for special pay and allowances in some sort of relation to their individual capabilities rather than according to their rank.

Such distinctions are made in the Army by having special allowances for Staff pay and so forth, and there is no reason why it should not also be done in the Air Force.

THE ROYAL AIR FORCE.

The Royal Air Force is now *in esse*, but is it too late therefore to correct some injustices which are made manifest by the publication of details of its organisation?

These are chiefly concerned with the proposed treatment of the R.N.A.S., which, for some reason or other, always appears to be treated as the Cinderella of the fighting forces. The new regulations, as they affect this very efficient body, have already caused considerable heartburnings among the personnel, and it would be well, before real harm is done, and disaffection aroused, to consider if it is worth while to let the Royal Air Force start its career free from any suspicion of jealousy or discontent in any section of its constituents.

On the surface it may appear that the R.N.A.S. is equally fairly treated with the R.F.C., but on examination the fallacy of this view is apparent. In the R.F.C. promotion has always been very frequent and free, and it is still going gaily on, but in the R.N.A.S. the scheme of promotion has occasioned brain storms among those who have tried to understand it. It is irregular, tardy, and, curiously, seems to favour pukka R.N. officers, men on home stations and those on the staff.

Then, to crown all, though the R.N.A.S. has carried on gallantly, being responsible for much good work, promotion practically came to a full stop at the beginning of this year.

Decorations continue to be given, but when such grounds as the following are given for the bestowal of a D.S.C.—"He has been eager and ready to go up at all times, and has shown no thought of personal danger" (of what man on war service could this not be said?), many good men are congratulating themselves on escaping such marks of distinction.

It is this condition of things which is at the root of the injustice which will be done to the R.N.A.S. if there is not some revision of the scheme of grading in the Royal Air Force.

Flight lieutenants and observer lieutenants who have worked keenly and gallantly on war service stations for two or more years (deserving promotion as much as any other officers with as much or less service, for every flying officer who has survived a year of war service may be reckoned, given equal opportunities, as good as any other officer) will be lumped with flight subs., observer subs., and warrant officers 1st class, in the rank of lieutenant, to take their chance then of a step to a higher rank in the "promotion by selection" scheme which is a feature of the Royal Air Force.

"Promotion by selection" is an excellent system, if selection is made on merit only, but it cannot be given a fair start in the Royal Air Force unless officers of the R.N.A.S. are at once put on an equal footing with officers of the R.F.C., in the matter of rank earned (if not gazetted) by war service.

An adequate way of dealing with the situation would be to grade as captains in the Royal Air Force all flight lieutenants and observer lieutenants, R.N., who have been in the R.N.A.S. since 1915, and who have been on war service for eighteen months. Their survival of war service for this period would be a perfect test of their capacity for the higher rank.

When lieutenants R.N.V.R. and assistant paymasters are to be graded as captains in the R.A.F. there seems to be no reason why the men who have fought so gallantly to establish our supremacy in the air should not be rewarded with at least similar rank.—M. F.

Pilot's Wonderful Escape Thanks to "TRIPLEX" SAFETY GLASS

Another Striking Example of "Triplex" Trustworthiness :-

DEAR SIRS,

.....While flying an Avro I crashed into a wireless car fitted with windows composed of your glass, hitting the car with such force as to completely smash in the whole of one side.

The sheet of glass was quite intact, but while being passed from hand to hand a few pieces were rubbed off.

The windscreen was also badly shattered but also held together in the same remarkable manner as the sheet of glass.

My goggles—also Triplex—were cracked all over and undoubtedly saved my eyes, since my face struck the forward edge of the cockpit with such force that it gashed my nose, necessitating seven stitches.

Yours, etc.,
XXXXXX XXXXX,
R.N.A.S.

Use "TRIPLEX" exclusively for GOGGLES, WINDSCREENS, WINDOWS OBSERVATION PANELS, Etc., Etc.

The Triplex Safety Glass Co., Ltd.,
(Reginald Delpech, Managing Director),
1, Albemarle Street, Piccadilly, London, W.1.
Telephone—1340 Regent.
Telegrams—"Shatterlys, Piccy, London."



THE ROYAL VISIT.

The Special Correspondent of the "Times" writing in an East Midland County on April 11th, says:—

"The King and Queen arrived by the Royal train this morning at a little country station a few miles away from a great aerodrome where Prince Albert is serving as a captain in the Royal Air Force. The young Prince, who was on the platform to receive his parents, exchanged affectionate and homely greetings with them. He kissed the Queen's hand and then her cheeks and was asked to explain his new uniform.

"The visit to the aerodrome was the first the King has paid to the newly-constituted Air Force. When the Royal party reached the parade ground they found one section of the men drawn up for inspection, wearing the uniform of the Flying Corps, and another section in the uniform of the Naval Air Service. The rank and file have yet to merge their old identity in the tunic of the new organisation. But the King came to them as the General-in-Chief of the combined and united third branch of his armed forces. Prince Albert took his place as the officer in command of the Naval Boys, and the King, attended by Brigadier-General Briggs and Lieutenant-Colonel Talbot, walked round the ranks.

"The place is a wonderful centre of activity and inspires the fullest confidence in the efficiency and equipment of British aviators. The King and Queen, in the course of an hour, saw machines and buildings and apparatus which three years ago had not come within the vision of Englishmen. Special attention was given to a Handley Page machine which rested on the green slope of an extensive plain. The King, after donning a white coat, climbed into the pilot's seat and had explained to him the control and other mechanism. The Queen, too, showed great interest in the details of the aeroplanes, and afterwards they spoke to several American officers.

"The change over from Naval ratings to the formation of the Royal Air Force is not being accomplished without many slips of tongue and action. The whole language of the aerodrome has to be forgotten, and a new one learned. A mess deck is now a dining hall, and every convention of land service on a sea basis is scrapped. Some of the men are not yet quite happy about the downfall of tradition, but they appear proud, nevertheless, of the distinctive recognition which has at last been given to their work."

[It is interesting to learn that R.N.A.S. ratings are not in love with the change to the R.A.F. The censoring of the name of the aerodrome is merely silly. The Court Circular has mentioned the station to which Prince Albert is attached. The Royal Aero's Club lists of pilots' certificates mentions it over and over again. The Huns have made various futile attempts to bomb it. The whole description of the activities there points to one place, so why need the Censor make himself look more ridiculous than his Maker made him?—Ed.]

THE EYESIGHT OF PILOTS.

Sir,—Perfect vision means, not only perfect acuity of vision, but the proper co-ordination of the images from the two eyes in the brain, or on their passage thereto; that is, not whether a man is short-sighted or astigmatic only, but whether he has, or has not, in addition to satisfactory acuity, the power of invariably fusing the two images under all, and every condition of stress, this is stereoscopic vision.

Two eyes, working together equally, are necessary in order to judge distance, perspective, etc., promptly; if a man loses one eye, it takes him some time to learn how to pick up a tumbler, or to put one down near the edge of a table, without missing the edge, and dropping the tumbler on the floor; or to place a cup in a saucer, or pour a fluid from one vessel into another, etc.

Defective stereoscopic vision, or the impairment of the power of fusion, is considered generally to be the cause of most squints in children; in mild cases squints are said to be latent, and are not noticeable, except when the children are tired, or nervous, or ill, and many persist throughout life in this form; a latent squint is corrected under conditions by the person affected, keeping up, involuntarily, some automatic will-power over the muscles moving the eyes; and it is quite conceivable, as a result of the tension during flying being suddenly removed, that these muscles are no longer under control, and the images of the two eyes are not fused for the time being, one eye only being used, so the sense of judging distance is lost, hence the reason why some men are found constantly to crash on landing, and may account for certain collisions in the air.

There is another matter dealing with vision, other than acuity, which affects a pilot; a man with a short-focus (not short-sighted) eye, frequently has excellent distant vision, but finds difficulty in seeing very small print in a bad light, this man is constantly having to over-use his focussing muscles; under normal circumstances he can do this without ill effects, but under any sudden stress, for instance, rapid descent, and landing with a fast machine, the muscles will fail to act properly, the vision deteriorate without warning, and a crash results.

Further, vision cannot be considered perfect if there is any defect in the recognition of colours.

(Signed) "Oculos."

THE WOMEN'S ROYAL AIR FORCE.

Arrangements are now sufficiently advanced for recruiting for the Women's Royal Air Force, known as the "Penguins," to begin this week. A considerable number of women are already engaged on work at air stations. Some of these, hitherto employed by the Royal Naval Air Service, are members of the Women's Royal Naval Service, others attached to the Royal Flying Corps belong to the Women's Army Auxiliary Corps. Members of the Women's Legion of Motor Drivers have also been doing duty at air stations. These women will be invited to transfer to the "Penguins" under practically the same terms and conditions as those under which they have served in the organisations in which they are now enrolled. Those who do not wish to transfer will remain in their own corps and will be re-posted to branches of the Navy or Army.

The recruitment of "immobile" members (that is to say, women liable for service in their own locality only) will be proceeded with first. "Immobile" members will live in their own homes, and will receive an allowance in lieu of food and lodging in addition to the fixed rate of pay. "Mobile" members, on the other hand, must be prepared to go to (a) any part of the United Kingdom; or (b) any part of the United Kingdom or oversea, according to the terms of their enrolment, and will be boarded and lodged in Royal Air Force quarters. Further particulars regarding "mobile" members will be issued in due course.

The Women's Royal Air Force will consist of officers, subordinate officers, and members. Every class of women is appealed to except those already engaged on national work. All questions of welfare, discipline, leave, medical services, discharges on grounds of urgency or compassion, and promotions will be controlled by women officers. The selection of senior women officers is being proceeded with, and appointments, when made, will be notified in the "London Gazette." The selection of women as junior officers will be made, as far as possible, from "the ranks." All grades will have an equal chance of promotion, and all will be on the same footing as regards length of service, namely, one year or the duration of the war, whichever may be the greater period. All will be called on to pass a medical examination, and to furnish satisfactory references. No women will be considered for home service under the age of 18, or for service oversea under the age of 20. Applicants must be prepared to undergo a limited period of training if required.

The main categories of employment are four—clerical, household, technical, and general. There is room for every variety of clerk, and the need is specially felt in London, and at Stamford, Birmingham, Lincoln, Oxford, York, Grantham, Salisbury, and Glasgow. The domestic section comprises cooks, waitresses, laundresses, and general domestic workers, and for these there will be a steady demand for the messes of Air Force officers and men and for those of the "Penguins'" quarters. The technical section offers great variety of employment, ranging from motor driving and motor cycling to different branches of aeroplane repair. Photographers, tracers, colourists, fabric workers, metal workers, fitters and aeroplane riggers can all be usefully employed. The general section includes storehouse women, tailors, shoemakers, and others.

Full particulars regarding rates of pay and conditions of service and method of application for "immobile" members may be obtained from any Employment Exchange on or after next Friday. No women for the "mobile" branch will be enrolled at present. Candidates for posts as officers should apply to the W.R.A.F. Inquiry Office, 9-13, Wellington-street, Strand, W.C., which will be open on Friday, or to the Professional Women's Register, Ministry of Labour, Employment Department, 28, Broadway, Westminster.

MUSIC HATH CHARMS.

If any reader of The Aeroplane happens to have a really first class gramophone which can be spared, it would be an act of kindness to present it to the R.F.C. Central Hospital at Hampstead. One does not suggest that a machine of the usual squeak and crash type should be donated—that is to say, one of the kind which Mr. O. Henry described as "Giving an imitation of Sousa's band excavating a march from a tin mine." The kind which would really be acceptable would be one of those nice, soft-toned instruments such as may be purchased by any munition profiteer for a matter of £30 or £40.

Many of the wounded officers are sufficiently strong to be able to move about in the hospital, but cannot get about to theatres and concerts, and therefore would be glad of a little decent music from time to time. Here certainly is an opportunity for some well-to-do aircraft manufacturer to recognise his indebtedness to the people who have assisted him in his success.

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT



Trade Mark.

AS A DRUM.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren Piccy, London."
" Phone—280 Gerrard

Works

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.



NAVAL and MILITARY · AERONAUTICS ·



FROM THE "LONDON GAZETTE."

War Office, April 6th.

With reference to an award conferred as announced in the "London Gazette" dated November 26th, 1917, the following is the statement of service for which the decoration was conferred :—

The Military Cross.

Sec. Lt. (temp. Capt.) Frederick Sowrey, D.S.O., R. Fus. and R.F.C.

For conspicuous gallantry and devotion to duty in shooting down in less than two months two Albatros scouts and a Rumpler two-seater and a Fokker scout, and in two engagements flying very low and engaging and scattering hostile infantry.

War Office, April 9th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Wing Comdr.—Maj. (temp. Lt.-Col.) J. A. Chamier, D.S.O., Punjabis, Ind. Army, a Comdt. (graded as a Wing Comdr.), Arty. and Inf. Co-operation School, and to retain his temp. rank while so empld., March 1st, seny. from April 29th, 1917.

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld. :—Temp. Sec. Lt. D. M. McGoun, Gen. List, March 8th; Lt. F. G. C. Weare, E. Kent R., March 11th; emp. Sec. Lt. I. D. R. McDonald, Gen. List, March 15th; Lt. W. L. Wells, Middx. R., T.F., March 19th; Capt. (temp. Maj.) R. A. Archer, M.C., R.A., reverts from a Sqdn. Comdr., and relinquishes his temp. rank, March 16th, seny. from March 1st, 1916.

Adjt.—Temp. Lt. A. W. Brittain, Notts and Derby R., to be transfd. to R.F.C., Gen. List, and to be temp. Capt. (without the pay and allowances of that rank) whilst so empld., March 3rd.

Schools of Instrn.—School of Technical Training.—Co. Comdr.—(Graded as an Equipt. Officer, 2nd Cl.)—Temp. Lt. T. C. Martin, R. Fus., to be transfd. to R.F.C., Gen. List, and to be temp. Capt. (without the pay or allowances of that rank) whilst so empld., Dec. 11th, 1917.

Memorandum.—Temp. Capt. to be temp. Lt., Gen. List, for service with Ind. Army (on prob.) :—B. White, from R.F.C., Dec. 21st, 1917.

Air Ministry, April 9th.

R.A.F.—The following appointments are made at the Air Ministry :—

S.O., 1st Cl.—Capt. (temp. Maj.) A. B. Winch, and to be temp. Lt.-Col. whilst so empld., April 3rd

S.O., 2nd Cl.—The rank of Capt. L. W. W. Lees is as now stated, and not as in the "Gazette" of April 2nd.

S.O., 3rd Cl.—The initials of Capt. P. N. Logan are as now stated, and not as in the "Gazette" of April 2nd.

S.O., 4th Cl.—The surname of Sec. Lt. (temp. Lt.) G. F. Allison is as now stated, and not as in the "Gazette" of April 2nd.

Memoranda.—C. B. Heald (temp. Maj., R.A.M.C.) is granted a temp. commission as Lt.-Col, April 1st.

Capt. F. G. Wilson to be temp. Maj., without the pay and allowances of that rank, whilst specially empld., April 10th.

Temp. Sec. Lt. (on prob.) R. Wilde to relinquish his commn. on account of ill-health, April 10th.

War Office, April 10th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing—Sqdn. Comdr.—Temp. Capt. A. J. Evans, M.C., Gen. List, from a Flt. Comdr., and to be temp. Maj. while so empld. (Feb. 13th).

Flt. Comdrs., from Flying Officers, and to be temp. Capts. while so empld.—Lt. D. V. D. Marshall, A.S.C., T.F. (Feb. 1st); Temp. Lt. J. E. Addinsell, Gen. List; Temp. Sec. Lt. F. Hyde, Gen. List; Temp. Capt. L. V. A. Royle, M.C., Gen. List (March 16th); Capt. B. Weil, A.S.C., Spec. Res.; Temp. Lt. R. A. Preston, Gen. List, and to be temp. Capt. while so empld.; Temp. Capt. O. Horsley, M.C., Gord. Highrs. (March 17th). And to be temp. Capts. while so empld. :—Lt. E. D. Hall, Northd. Fus., T.F.; Temp. Sec. Lt. R. D. Starley, M.C., Gen. List; Temp. Sec. Lt. O. E. Carter, Gen. List (March 23rd).

Adjt.—Temp. Lt. (temp. Capt.) J. H. Jackson, Gen. List, ceases to hold his appt., March 6th.

Schools of Instrn.—Schools of Mil. Aeronautics.—Asst. Instr.—(Graded as an Equipt. Officer, 3rd Cl.)—Lt. H. E. Haslehurst, Lpool. R., a Flying Officer (March 18th).

School of Technical Training.—Asst. Instr.—(Graded as an Equipt Officer, 2nd Cl.).—Temp. Lt. H. E. Hotchin, Gen. List from Officer in charge of Stores (graded as Equipt. Officer, 2nd Cl.), Oct. 12th, 1917.

Gen. List.—Temp. Capt. F. A. Forde, Gen. List, relinquishes the rank of temp. Lt.-Col. on ceasing to hold the appt. of Comdt. Off. Technical Training Corps (March 11th).

War Office, April 11th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing—Sqdn. Comdr.—Lt. (temp. Capt.) C. A. Ridley, D.S.O., M.C., R. Fus., from a Flight Comdr., and to be temp. Maj. while so empld., March 19th.

Gen. List.—To be temp. Sec. Lt. :—1st Cl. Air Mech. C. M. Martin, from R.F.C., Jan. 5th.

* * *

The King has been pleased to approve of the following rewards for distinguished services in the Field in connection with Military Operations, culminating in the capture of Jerusalem. Dated January 1st, 1918 :—

The Military Cross.

Lt. (temp. Maj.) V. A. Beaufort, Devon. R. and R.F.C.
Temp. Capt. G. R. A. Deacon, R.F.C.
Temp. Sec. Lt. A. Hopkins, B.W.I. Regt., and R.F.C.
Temp. Lt. J. Kirk, R. Highrs. and R.F.C.
Temp. Lt. D. R. Mackie, R.E. and R.F.C.
Sec. Lt. H. L. C. McConnell, Ind. A. R. of O. and R.F.C.
Temp. Sec. Lt. J. H. Maingot, B.W.I. Regt. and R.F.C.
Capt. I. P. H. Preston, Gen. List and R.F.C.
Lt. A. H. St. Clair, Arg. and Suthd. Highrs. and R.F.C.
Capt. T. G. Thornton, York R. and R.F.C.
Capt. F. E. Williams, Welsh Regt. and R.F.C.
Lt. (temp. Capt.) G. H. B. Wilson, Gen. List and R.F.C

Australian Force.

Lt. C. Le B. Brown, F.C.
Lt. W. A. Coates, F.C.
Lt. H. L. Fraser, F.C.
Lt. O. M. Lee, F.C.

The Meritorious Service Medal.

No. 403988 (frmly 51031) 1st Cl. Air Mech. (A./Cpl.) H. Anthony, R.F.C. (Lower Edmonton, N.); 3206 S.-Maj. W. A. Bradwell, R.F.C. (Birdwell, nr. Barnsley); 1669 Flt.-Serjt. C. W. Etheridge, R.F.C. (Bishop's Waltham, Hants); 403891 (frmly 50948) Serjt. T. Evans, R.F.C. (Merthyr); 3090 Flt.-Serjt. C. C. Gissing, R.F.C. (Northampton); 1221 Flt.-Serjt. W. J. F. Golding, R.F.C. (Kensington); 9029 Flt.-Serjt. F. S. Hall, R.F.C. (Sittingbourne); 3552 Flt.-Serjt. J. S. Hunt, R.F.C. (Blandford, Dorset); 4256 Serjt.-Maj. T. J. Huxter, R.F.C. (Barry Dock, Glam.); 11895 Serjt. A. L. Payne, R.F.C. (Blackheath, S.E.); 404005 (frmly 51204) Cpl. C. H. Phillips, R.F.C. (Cardiff); 3030 Serjt. F. W. Pound, R.F.C. (Liverpool); 403005 (frmly. 65382) 1st Cl. Air Mech. J. Rankin, R.F.C. (Kilmarnock); 1527 Flt.-Serjt. F. O. Walker, R.F.C. (Chudleigh, Devon); 7643 Cpl. F. E. Wilson, R.F.C. (Great Yarmouth).

Australian Imperial Force.

Aus./108 Serjt. W. A. Beard, F.C.; Aus./455 A.-Serjt. O. H. Coulson, F.C.; Aus./124 A.-Flt. Serjt. J. H. Rogers, F.C.; Aus./320 Flt.-Serjt. H. L. Sleeman, F.C.; Aus./104 Flt.-Serjt T. Watkins, F.C.

War Office, April 12th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers.—And to be temp. Capts. while so empld. :—Temp. Lt. G. E. Gibbons, Gen. List; Temp. Sec. Lt. W. E. Theak, Gen. List, March 21st; Temp. Sec. Lt. F. S. McClurg, Gen. List, March 28th.

Schools of Instrn.—Schools of Mil. Aeronautics.—Asst. Instr.—(Graded as an Equipt. Officer, 2nd Cl.)—The rank of Capt. R. C. Morgan, Canadian Local Forces, is now described, and not as in the "Gazette" of Feb. 26th.

GALLAY ACHIEVEMENTS

Their excellence and the reasons thereof

1. Our **system of construction** is proved by Government test to be 15 per cent. more efficient than any other type with equivalent water space and air orifice.
2. It is **lighter** per B. Th. U. dissipated than any other type.
3. It is **stronger** and yields less to impact than any other systems and owing to homogeneity of structure it will stand greater stresses vertically, horizontally or frontal.
4. The strength is inherent and not dependent on **tanks** or **casings**. The latter can be entirely dispensed with.
5. Every particle of metal used in construction acts as a **cooling agent.**
6. Each **waterway** is **regular** throughout its length.
7. **Air resistance** is reduced to the **minimum,** no blobs of solder obstruct the air passages, a regular wind cutting edge is always presented.
8. We have **reduced** the **radiator factor** to limits hitherto considered impossible.
9. Our system is suitable for **pump** or **Thermo** syphon.
10. We are Aero engineers and our staff comprise **specialists** in each department.

WE WERE THE PIONEERS
OF
LIGHT, STRONG and EFFICIENT RADIATORS

GALLAY RADIATOR CO., LTD.,

L. T. DELANEY, Managing Director.

198, Great Portland Street, London, W.1.

Telephone—4826 Mayfair. Telegrams—"Galyradico, Wesdo, London."

L.T.D.

The following extracts, dealing with the work of the R.F.C. in Italy, are taken from a dispatch from Lt.-Gen. Sir Herbert Plumer, K.C.B., dated March 9th, 1918:—

The work of the R.F.C., under Brig.-Gen. Webb-Bowen, during the period under review has been quite brilliant. From the moment of arrival they made their presence felt, and very soon overcame the difficulties of the mountains. They have taken part in all operations, and rendered much assistance to the Italians in the air. They have carried out a large number of successful raids on enemy aerodromes, railway junctions, etc., and have during the period destroyed 64 hostile machines, a large proportion of which were German, and nine balloons, our losses to the enemy during the period being 12 machines and three balloons, a record which speaks for itself. . .

The artillery has rendered very useful service. Our gunners soon became accustomed to the altered conditions, and carried out many successful destructive shoots. A comparison of the photographs of hostile battery positions when our artillery entered the line with the positions now occupied shows that the enemy batteries have been successfully forced back almost throughout the whole front. . . .

[Sir Herbert Plumer pays compliments to the work of the Intelligence Service and to the co-operation of the Intelligence, Artillery, and the R.F.C.]

AIR MINISTRY, April 12th.

The following appointments are made at the Air Ministry:—

R.A.F.—S.O. 2nd Class: Capt. H. Foord, and to be temp. Maj. while so empld. (April 1st); Capt. (temp. Maj.) W. J. C. Kennedy-Cochran-Patrick, D.S.O., M.C. (April 6th).

MEMORANDA.—Sec. Lts. are granted the rank of temp. Capts. (ad.) while empld. as Courts-Martial Officers: G. Johnson, A. W. Rippon (April 1st).

Lts. to be temp. Capts., without the pay and allowances of that rank, while specially empld.: V. J. Hammond, L. F. Jones, A. L. Harrow-Bunn, M.C., A. L. Wilson, R. M. Nicholls, F. Tymms, M.C., S. T. Fripp (April 1st).

Sec. Lt. (Hon. Lt.) R. Cook to be temp. Capt., without pay and allowances of that rank, while specially empld. (April 1st).

WAR OFFICE, April 13th.

The following extract is from a dispatch from Lt.-Gen. Sir A. A. Barrett, Commanding Northern Army, India, describing the operations against the Mahsuds in March-August, 1917:—

Gen. Beynon, who had the use of aeroplanes (still a novelty on the North-West Frontier), began his offensive on June 13th, and in a series of fine actions and marches compelled the Mahsuds in a fortnight's time to sue for peace.

WAR OFFICE, April 15th.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.—Lt. M. R. N. Jennings, Spec. Res. (March 20th, seny. from May 27th, 1917); temp. Sec. Lt. A. K. Cowper, Gen. List (March 24th); Capt. (temp. Maj.) H. F. Glanville, W. Ind. R., reverts from a Sqdn. Comdr., and relinquishes his temp. rank (March 19th, seny. from Sept. 25th, 1915).

Adjt.—Temp. Sec. Lt. H. Waddington, Manch. R., to be transfd. to R.F.C. Gen. List, and to be temp. Capt. (with pay and allowances as Lt.) while so empld. (Feb. 21st).

Park Comdr.—Capt. (temp. Lt.-Col.) F. A. G. Noel, Spec. Res., from a Special Appt. (graded as a Depôt Comdr.) to relinquish the rank of temp. Lt.-Col. and to revert to the rank of temp. Maj. while so empld. (Jan. 17th, seny. June 8th, 1917).

SPECIAL APPT.—Graded as a Park Comdr.—Lt. (temp. Capt.) J. Pearce, K. O. Sco. Bord., from an Equipt. Officer, 1st Cl., and to be temp. Maj. while so empld. (March 18th).

SCHOOLS OF INSTRN.—SCHOOL OF TECHNICAL TRAINING.—Asst. Instr.—Graded as an Equipt. Officer, 2nd Cl.—Temp. Sec. Lt. A. Patterson, Gen. List, an Equipt. Officer, 3rd Cl., and to be temp. Lt. while so empld. (March 21st).

GEN. LIST.—3rd Cl. Air Mech. H. Pender, from R.F.C., to be temp. Sec. Lt. (Jan. 11th).

* * *

The following are among the Decorations and medals awarded by the Allied Powers at various dates to the British Forces for distinguished services rendered during the course of the campaign. The King has given unrestricted permission in all cases to wear the Decorations and medals in questions:—

CONFERRED BY THE KING OF THE BELGIANS.

ORDRE DE LEOPOLD.

OFFICIER.

Bt. Lt.-Col. (temp. Brig.-Gen.) T. I. Webb-Bowen, C.M.G., Bedf. R.

DÉCORATION MILITAIRE.

37208 Cpl. A. W. Daniells, R.F.C. (Goldsboro Road, S.W.).
12515 1st Cl. Air Mech. A. Langstaffe, R.F.C. (Boston).

CROIX DE GUERRE.

Temp. Lt. (temp. Capt.) C. B. Baker, Oxf. and Bucks L.I. and R.F.C.
Temp. Capt. K. F. Balmain, R.F.C.
Sec. Lt. W. D. Bostock, R.F.C. (Spec. Res.).
Temp. Capt. W. P. MacD. Brettell, R.F.C.
Temp. Lt. L. D. Brown, R.F.C.
Maj. A. D. Carter, D.S.O., New Brunswick R. (Canadian Forces) and R.F.C.
Capt. (temp. Maj.) J. A. Cunningham, R.F.A. and R.F.C.
Capt. E. A. Fawcus, Northd. Fus. and R.F.C.
Temp. Sec. Lt. C. R. H. Ffolliott, Linc. R. and R.F.C.
Temp. Sec. Lt. R. Harris, R.F.C.
Capt. (temp. Maj.) M. K. Horn, M.C., R.F.C. (Spec. Res.).
Lt. (temp. Capt.) R. H. Jarvis, M.C., R.F.C. (Spec. Res.).
Temp. Capt. G. Knight, M.C., R.F.C.
Lt. (temp. Capt.) J. McKelvie, R.E. and R.F.C..
Temp. Capt. L. Mason, M.C., R.A.
Temp. Sec. Lt. W. F. Mayoss, R.F.C.
Temp. Capt. A. D. Pearce, R.F.C.
Lt. R. C. Purvis, W. Rid. R., and R.F.C.
Temp. Sec. Lt. R. W. Rose, R.F.C.
Maj. H. S. Walker, Ches. R. and R.F.C.
Temp. Sec. Lt. W. Walker, R.F.C.
Bt. Lt.-Col. (temp. Brig.-Gen.) T. I. Webb-Bowen, C.M.G., Bedf. R.
43958 1st Cl. Air Mech. L. F. Bolton, R.F.C. (Westminster, S.W.).
10551 Cpl. E. Bradshaw, R.F.C. (Tonbridge).
88059 2nd Cl. Air Mech. F. Broscomb, R.F.C. (Hunslet, Leeds).
15422 1st Cl. Air Mech. B. Brown, R.F.C. (Bitterne, Hants).
3497 Cpl. W. J. Collett, R.F.C. (Leighton Buzzard).
8545 1st Cl. Air Mech. C. A. Davey, R.F.C. (South Norwood).

* * *

The following names should have appeared among the recipients of Military Medals on March 13th, instead of as "mentioned in dispatches":—

AUSTRALIAN IMPERIAL FORCE.

Aust./120 Serjt. B. F. Jones, F.C.
Aust./20 Serjt. R. Lonsdale, F.C.
Aust./1750 1st Cl. Air Mech. H. S. Raphael, F.C.

FROM THE COURT CIRCULAR.

ROYAL TRAIN, April 9th.

In the afternoon Their Majesties proceeded to Messrs. Robe and Co.'s premises, and after inspecting the works left for Lincoln Cathedral.

Sir Henry Fowler (Assistant Director of Aircraft Production) was in attendance, representing the Ministry of Munitions.

WINDSOR CASTLE, April 11th.

This morning The King and Queen visited an Air Station and were received on arrival by Brigadier-General H. D. Brigg and Captain the Prince Albert, R.A.F.

On the conclusion of the inspection Their Majesties left by special train for Windsor, reaching the Castle shortly after 6 o'clock.

WINDSOR CASTLE, April 13th.

The King, attended by the Gentlemen in Waiting, went to London this morning.

The following had the honour of being received by the King at Buckingham Palace, when His Majesty invested them with the Insignia of the Order into which they have been admitted:—

THE DISTINGUISHED SERVICE ORDER AND THE MILITARY CROSS—Maj. John Kinnear, The King's (L'pool Regt.) and R.A.F., and Capt. Clive Warman, R.A.F.

The King then conferred decorations as follows:—

THE MILITARY CROSS.—Capt. Malcolm Vyvyan, R.G.A., attd. R.A.F.; Lt. William Black, Cameron Highlds., attd. R.A.F. Sec. Lt. John Rodger, The King's Own (Yorks. L.I.), attd. R.A.F.

THE ALBERT MEDAL.—Lt. Frederick Smith, R.A.F. At an aerodrome a bomb accidentally exploded in the mouth of a dug-out forming a bomb store, which contained a large number of bombs packed in wooden cases and a quantity of rockets. Two men were killed by the explosion, and another man, who was severely injured, was thrown down into the store. Dense volumes of smoke issued from the dug-out, and there was great risk of a further explosion. On hearing a call for help, Lt. (then Sec. Lt.) Smith, accompanied by Serjt. William Ernest Rhoades—who has also been granted the Albert Medal—immediately entered the dug-out, and they succeeded in rescuing the injured man, who would otherwise have been suffocated

OFFICIAL COMMUNIQUES.

MILITARY.

G.H.Q. COMMUNIQUÉS.

APRIL 9th, 8.40 p.m.—With the exception of a few flights at a low altitude, no flying took place on the 8th inst. owing to mist and rain.

One hostile balloon was brought down.

None of our aeroplanes is missing. One of our aeroplanes which was reported missing on the 7th inst. has since been located.

APRIL 10th, 8.2 p.m.—During the morning of the 9th inst. the whole front was covered in mist, which prevented any of our aeroplanes leaving the ground.

(Continued on page 1455.)

SELSDON

AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W. 1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO. CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

: IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

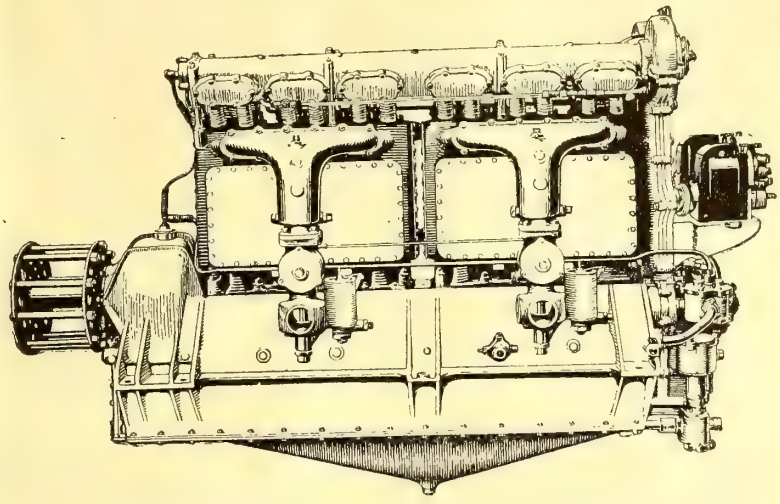
UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.



6-CYLINDER SUNBEAM-COATALEN AIRCRAFT ENGINE.

SUNBEAM-COATALEN AIRCRAFT MOTORS

are original in conception and have gained the greatest of all records—that of unfailing good service in every hostile area.

THE SUNBEAM MOTOR CAR CO., LTD., WOLVERHAMPTON.

" " CONTRACTORS TO " "
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge Motor Factory
WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—III.

BY C. SYLVESTER.
Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Internal Combustion.

We have dealt to some length with the laws of pressure, lume, and the expansion of gases. So much so that the ident will have a clear idea of the methods adopted for lculating the amount of work done. It is now essential that e various cycles of operation should be carefully considered. In practice it may be said that internal combustion engines e designed upon the known rise of temperature, and the nsequent rise of pressure which is the direct result of the plosion. This should be constantly borne in mind by the signer, because it is upon these factors that the mechanical sign of the engine and the necessary strength of the various rts are determined.

Cycles of Operation.

Internal combustion engines differ inasmuch as some operate on what is known as the "Two Cycle" plan, while others erate upon the well-known "Otto" or four-cycle plan. our-cycle engines are most generally used.

Two-Cycle Engines

In a two-cycle single-acting engine the exhaust gases are pelled through a number of ports in the cylinder walls. These rts are uncovered by the piston at the end of the stroke. If a o-cycle engine is designed double-acting, these exhaust ports e placed approximately in the centre of the cylinder. In this se the piston is made proportionately long, and the exhaust rts serve both ends of the cylinder in turn.

From this it will be seen that the action of the piston has actically no effect upon the clearing of the exhaust gases. he result is that they are got rid of by other means, usually a ecial air pump which supplies a scavenging pressure of about ght pounds per square inch.

Four-Cycle Engines.

The action of a four-cycle engine may be said to be as llows:—

The first stroke, termed the suction stroke, sucks petrol, gas, other explosive mixture and air into the cylinder.

The second stroke, termed the compression stroke, compresses e mixture into a very small space at the end of the cylinder, rmed the combustion chamber. Just before the piston reaches e maximum compression point the charge is fired or ignited.

The piston, having now passed the top dead-centre point, com-ences upon the expansion or working stroke.

The fourth stroke, sometimes termed the exhaust or scavenging. roke, merely expels the burnt gases out through the exhaust ort.

Fig. 4 shows the position of the piston in the cylinder at the mmencement of each stroke.

Valve Operation.

To enable the four-cycle operation to be carried out, it is apparent that means must be provided to allow the gas to enter the ylinder and for the exhaust gases to leave it. This arrangement is effected by means of inlet and exhaust valves, which are perated by means of a camshaft.

Referring again to Fig. 4 it will be seen that the cylinder receives its combustion charge once every two revolutions of the rankshaft. Thus the valves operated by the camshaft must pen once every two revolutions.

Briefly, the inlet valve is open at the commencement of the first roke, and it remains so until the completion of the stroke. It closed during the remainder of the two revolutions.

The exhaust valve opens when the piston has travelled almost 7/8 of the working stroke, and it closes at the end of the exhaust stroke. From this it will be seen that, in the whole of the four cycles, the exhaust valve remains open for a longer period than the inlet valve.

As stated above, the inlet and exhaust valves are operated by a cam shaft. That is, they are opened by cams fitted on a shaft. The closing operation is, however, effected by means of springs, which are compressed by the cams when the valves are opened.

In some types of petrol engines the inlet and exhaust valves are on one side of the cylinders. When this is so it is only necessary for one cam shaft to be fitted. If the inlet valves are fitted on one side of the cylinder, and the exhaust valves are on the other side, then it is necessary that two cam shafts should be fitted.

As previously stated, the speed of the cam shaft is exactly half that of the crank shaft, and to obtain this reduction of speed the two shafts are connected together with a two-to-one ratio of gearing. The type of gearing used depends upon the type of engine. Thus, when the cam shaft operates the valves by means of tappet rods, the gearing is of the spur type. If the valves are operated by a shaft fitted above the cylinder head the connection between the crank shaft and the cam shaft is effected by bevel gearing, the actual transmission being carried out by a vertical shaft. The design of valve springs will be dealt with when valve design is considered.

Vertical Cylinder Engines

Up to the present we have been considering the operation of one cylinder only. It is therefore necessary to point out that the number, type, and position of the cylinders depend upon the type of engine. Some types of aero engines are fitted with vertical cylinders, others with the cylinders arranged in the shape of a V.

In considering the six-cylinder vertical type engine, it may be said that the crank shaft is fitted with six cranks, which, for the purpose of illustration, are numbered 1 to 6 respectively. The setting of Nos. 1, 2, and 3 cranks are exactly 120 deg. apart, as are Nos. 4, 5, and 6. Nos. 1 and 6 are 0 deg. apart. Nos. 2 and 5 are the same, as are Nos. 3 and 4. This is made quite clear in Fig. 5, which shows cranks 1, 2, and 3 in section. Cranks Nos. 6, 5, and 4 are immediately behind Nos. 1, 2, and 3.

V Cylinder Engines.

Some types of engine are known as the V type engine. This means that the cylinders are set in the shape of a V. The Sturtevant model, 5A, 140 b.h.p., aero engine, is a typical example of the V type engine. The design of this engine will be fully dealt with in a later article.

The setting of the cranks of a V type engine depend upon the number of cylinders. From this it is not meant that a twelve-cylinder engine would be fitted with twelve cranks; it would have six cranks only, the setting of which would be the same as those on a six-cylinder vertical type engine. In this case two connecting rods are fitted on one crank.

In Fig. 6 we find the plan of a twelve-cylinder engine. Cylinders 1 and 12 have their connecting rods fitted to crank No. 1. Nos. 2 and 11 are fitted to crank No. 2, and so on.

It may be a little difficult to understand the exact position of the pistons in any or the whole of the cylinders at any one time. In order that this may be more clearly understood we will consider one pair of cylinders only. Since the two connecting rods are fitted to the same crank, it is clear that the only time

that the two pistons are in the same position in their respective cylinders is when the crank is exactly between the cylinders in either the top or bottom positions

This is shown in Fig. 7, where the crank is exactly between the two cylinders in the top position. From this diagram one can see that if pressure be exerted on piston No. 1 the direction of rotation will be as indicated by the arrow. At the same time, piston No. 2 is moving towards the cylinder head until the position indicated by the dotted line is reached. In this position No. 2 piston is in the position known as "top dead centre," but piston No. 1 has yet some distance to travel in the same direction before "bottom dead centre" is reached, namely, to the point indicated by the dotted line A.

If Figs. 5 and 7 are now carefully studied it will be seen that the position of the pistons in Nos. 6 and 7 cylinders are the same as those in Nos. 1 and 12, and that the difference between 1 and 12 and 2 and 11 will be 120 deg., that is, if we take two strokes as being equal to 360 deg.

Order of Firing.

The order of the firing of all internal combustion engines depend upon the crank setting. In a four-cylinder engine, where cranks Nos. 1 and 4 are set 180 deg. from Nos. 2 and 3, the order of firing will be 1, 2, 4, 3, or 1, 3, 4, 2. Six-cylinder engines usually fire in the order, 1, 5, 3, 6, 4, 2.

This applies to petrol engines only. Where large Diesels are concerned it is of the utmost importance that the order of firing should prevent two adjacent cylinders firing after each other. If this were allowed it would be found that a considerable amount of back pressure would exist in the main exhaust pipe.

It is therefore excellent practice to arrange the order of firing so that the exhaust gases from one cylinder do not affect, to any great extent, the exhaust gases from another cylinder in their passage to the silencer. It has been found from experience that the best order of firing of large Diesel engines is 1, 4, 2, 6, 3, 5.

Lubrication.

Lubrication in all types of internal combustion engines is a matter of great importance. In aero engines, where a pilot depends upon his engine to never exceed a pre-determined amount of oil consumption, this is still more important.

The majority of oil consumed by an aero engine is burnt by the heating effect of the cylinders, the remainder lubricates the crank shaft and connecting rod bearings, etc.

The oil supply to all bearings and gearing is forced, the pressure varying from five to thirty pounds per square inch, according to the type and b.h.p. of the engine. The circulation of the oil is accomplished by means of a pump, which draws the oil through a suction pipe to a filter. From here it is distributed by means of small pipes to the exact points where it is desired that the oil should be delivered. After doing its work the oil flows into the base of the engine, when the operations are repeated. For very large Diesels and oil engines the "splash system" of lubrication is adopted. This system may be described as a large bath of oil, the bath forming the base of the engine. As the crank shaft rotates the big-ends of the connecting rods dip into the oil, and splash it over the small-ends, and inside the cylinder walls.

(To be continued.)

THE MASS OF OFFICIALDOM.

The following letter deserves attention:—

Sir,—I must say I sincerely endorse the sentiments set forth under the heading "The Mass of Officialdom." The only way it seems is to hammer at them hard, week after week, until someone notices it and comments upon it.

Not only do these official pests affect the men physically (as is often noticed), from the directors to the boy who does everything, but in another and more destructive way; it affects them, and everyone, in a subtle, or psychical, sense—shall I say? It entirely takes the originality and ingenuity right out of the employers, and employed. I have noted dozens of cases.

England has always been more or less in the rut, but there is no excuse for making new ruts to get stuck in. No sooner does a man evolve an idea, than it is thunderously squashed by some meddling official, who would be far better employed picking weeds or filling sandbags, and whose sublime ignorance merely serves to keep him in his position. I have dealt with such, much to my sorrow.

I know of an ex-barman from the Vauxhall Bridge Road who is an inspector of aircraft material, and who meddles and muddles all over his district in a car, and has gallons of petrol to joy-ride the whole of his leisure hours.

Before I close, here is an actual chestnut which happened not far from here, and which I witnessed. We had eighteen extra long pistons standing on the bench with the rings off. An official examiner was there, and picked up one of the pistons and carefully examined it, remarking, "You have got some awful scratches in this 'shell.'" Of course I said "What 'shell'?" He then said "What's this, if it isn't a 'shell'? I thought they (indicating all the pistons) were 'shells'!"

Do you blame us for smiling? This is an absolute fact, and I could hardly credit the man's ignorance. That was in the early stages of the war. Now my ears and eyes are quite accustomed to this kind of thing. I could see an aero engine mistaken for a case hardening furnace, and simply yawn with boredom. Do you think such mis-management will win us the war? I don't!

A. E. B.

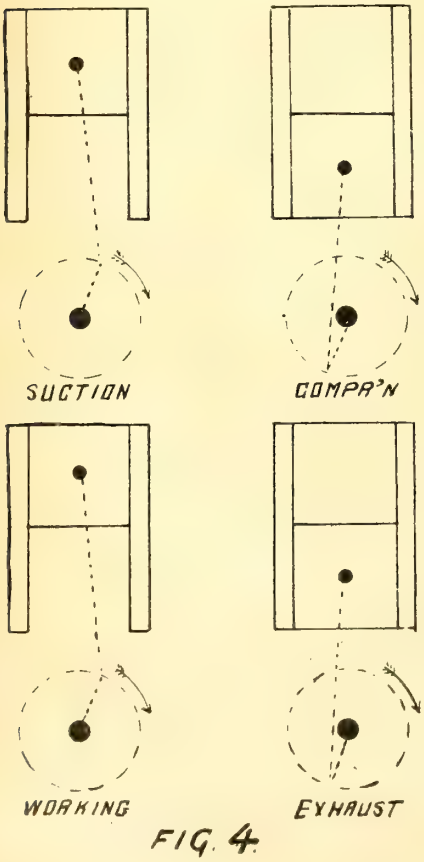


FIG. 4.

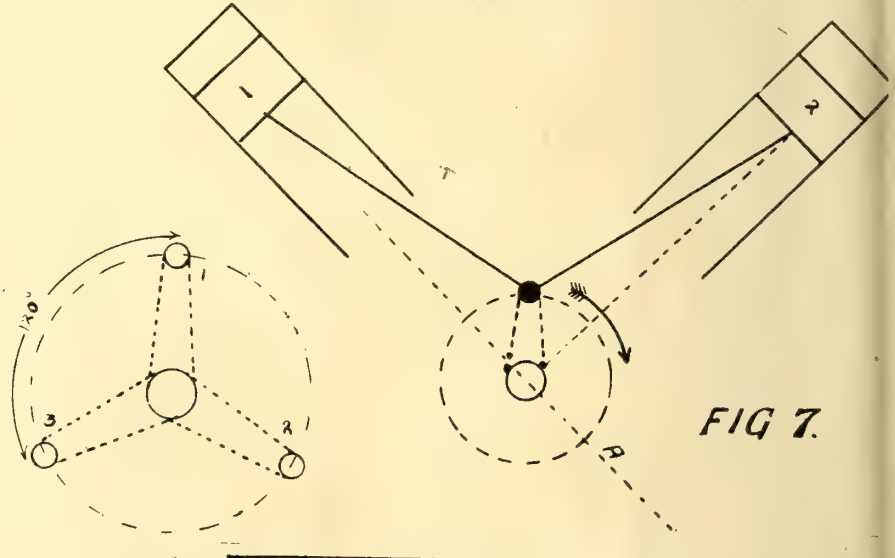


FIG 7.

FIG 5.

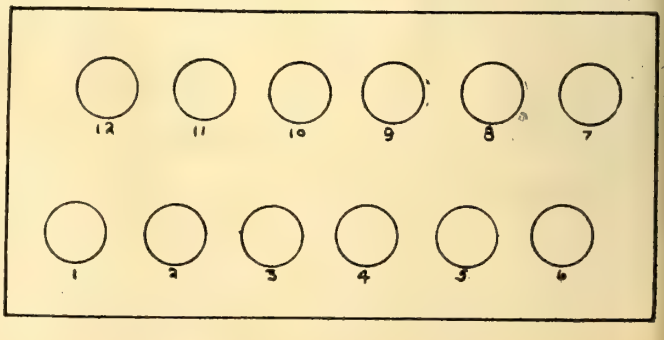


FIG. 6.

CELLON

(NON-POISONOUS)

DOPE

CELLON LTD.,

BROAD STREET HOUSE, E.C.2.

Telegrams—"AJAWB," LONDON. Telephones—LONDON WALL, 5359, 3622,

Contractors to H.M. Government.

The Commercial Attache.

Can He Help us, and if so How?

BY "MEDWAY."

In a recent note, I tried to show how we could, and ought to, make some real use of the services of our Trade Commissioners in the Empire Overseas. The Case of the Commercial Attaché in a foreign country is somewhat similar but not quite on all fours.

A few years ago it would probably have been mainly a waste of time to bother about the Commercial Attaché or the Consul at all. The poor fellow was generally paid so little that most of his time had to be spent in devising means of living within his income, and he had none to spare for considering other people's needs.

Moreover, being badly paid, it was generally recognised that, despite his best efforts at official dignity, he was probably no one in particular—a person of very limited influence and status.

Furthermore, the mere fact that he accepted such a rotten salary weighed against him.

A successful business man cannot raise much respect for anyone who is prepared to settle down for life on an annual income considerably less than the weekly salary of a popular music-hall comedian. Thus nobody—and probably we may include the Consul himself—had much faith in his ability to help.

The men who did best out of the business were most likely to be found among the "unpaid" Consular staff, who—being mainly foreigners, and frequently Germans—got a sort of local status out of the positions they held, and, in some cases, were probably in receipt of subsidies from Berlin.

But the basic trouble about the whole British Service, in so far as it was British, was the old idea that any connection with commerce or industry was a degrading thing which soiled the hands, shirt-cuffs, and souls of those who participated in it.

The diplomatist—generally supposed, rightly or wrongly, by the outsider to be a sort of gilded super-liar—was universally admitted to be a person of distinction.

The Commercial Attaché and the Consul were, by comparison at least, very small beer, both socially and financially. Consequently, they never got a fair chance.

There is, however, some hope that, from now onwards, things will be different.

The Commercial Attaché will be the right-hand man of the Ambassador, and his advice within his own sphere will not be lightly overlooked.

He will be given weight sufficient to enable him to balance and counter the intrigues which so often result in important contracts going to foreign manufacturers when Great Britain had the best right to them. The "Nation of Shopkeepers" is at last trying to give up feeling ashamed of keeping a shop, and is to attempt to advertise and sell its wares.

Consequently, the suggestions that I have made as to utilising the Trade Commissioners within the Empire apply equally to the Commercial Attaché.

We shall want him to find out for us where there is room for aerial services, and we must let him know what sort of information we expect from him or his staff.

We want, also, his personal offices in the way of educating foreign Governments up to an appreciation of their own needs. It is no good to us if they want aerial services, and do not know that they want them.

The Commercial Attaché can talk the language, and can meet and entertain the right people, and teach them to take an up-to-date point of view.

There are plenty of cases in which the necessity for acceleration of the mails is the main cause of very heavy capital expenditure on railways or roads.

There are plenty of countries in which communications are generally conducted in a thoroughly leisurely manner—I refer not to the railways of Kent, but to places farther afield—to where there are a limited number of busy men to whom time is money.

Given a slow road service and an express aeroplane service, the need for a railway would often be removed, or postponed until the project has a decent chance of paying its way almost at once.

This is the kind of point which the Commercial Attaché will rub in, provided that we feed him with the necessary knowledge and keep on jogging his elbow and reminding him of our existence.

Having brought his people nearly up to the scratch, we want him to go ahead and to do something for us which it is not—should not be—necessary to ask of the Trade Commissioner.

He must keep his eye open for foreigners waiting to snatch the business he has nursed. He must see that people are thoroughly impressed with the superiority of British machines.

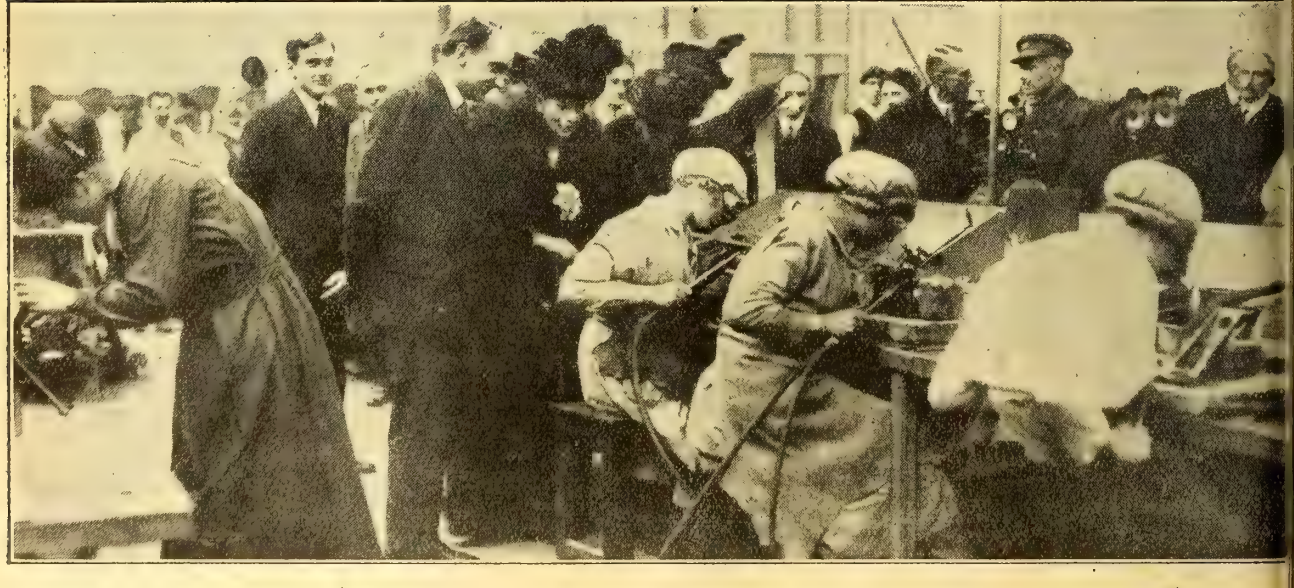
If he is to do this, he must be able to argue the case, and must provide him with the arguments. He has many things to think about, and none too much time to spare, so we must put our points to him shortly and very clearly, assuming that he is no expert.

If we take these precautions, then we stand a good chance of getting business. If others get it instead of us, and our many tame Government places a big order for German aeroplanes for all the local services, then, at least, we can fix the blame, and it does not fall upon us.

I assume that our commercial officials will be given decent entertainment allowances, and that neither an exaggerated idea of politeness to foreign competitors, nor an over-scrupulous notion of how to treat officials with open hands and empty pockets, will be held to be sufficient excuse for failure when more direct measures seem destined not to succeed.

The aeroplane business will be rather a queer one. The trading will not be of the ordinary retail kind.

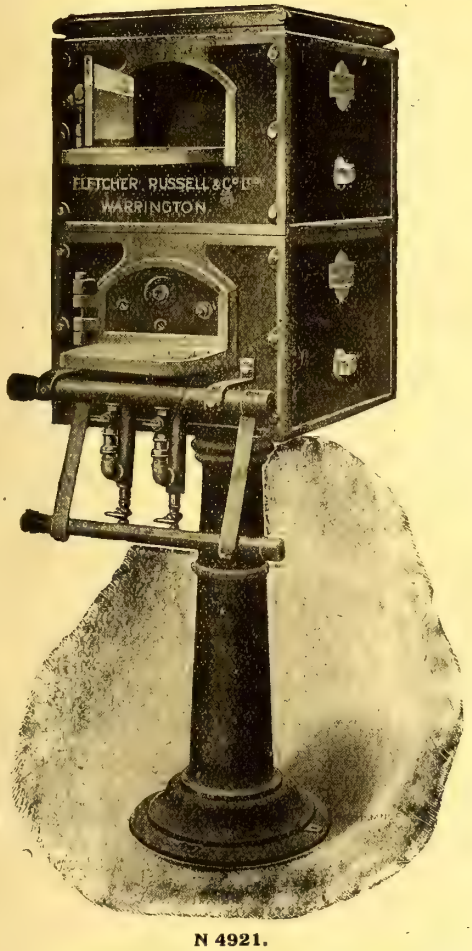
This is all the more reason why, if the Industry takes the trouble to interest the official, the official—if competent, as I honestly believe he will be—will be likely to take special pride in bringing off something big for the Industry.



Her Majesty Queen Alexandra and the Princess Victoria watching the acetylene welders at work at the Handley Page Works. Mr. Handley Page is seen explaining the work to the Queen.

GAS HEATED FURNACES

For the Treatment of High Speed Steel.

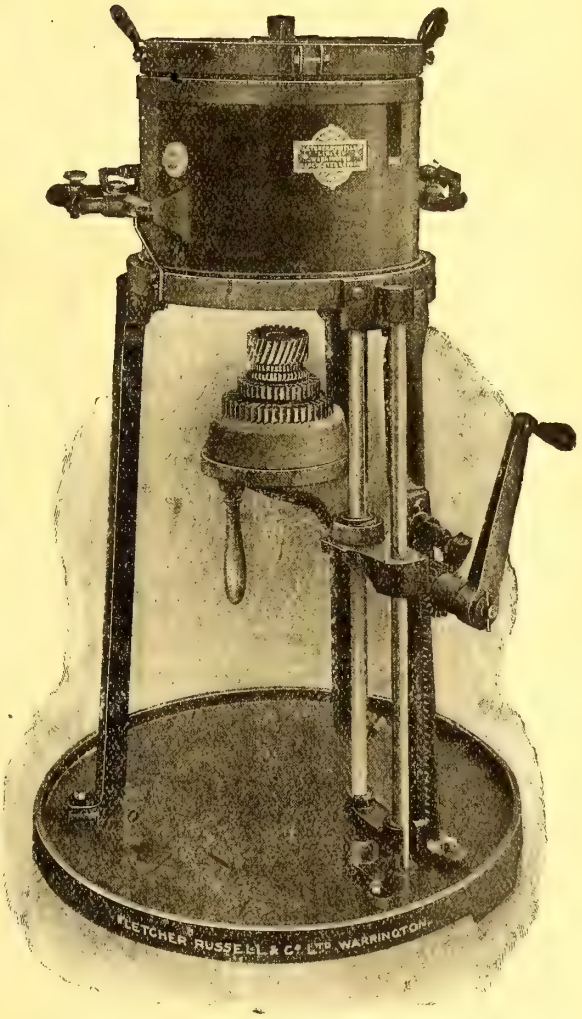


N 4921.

AEROPLANE PARTS, &c.

and other work where High Temperatures are required.

For Hardening "HIGH SPEED" TOOLS, CUTTERS, DIES, MILLING AND LATHE TOOLS.



N 4475.

FLETCHER, RUSSELL & Co., Ltd.,

PALATINE WORKS, :: CENTRAL ROAD,

WARRINGTON.

The Liberty Engine and Other Things American.

The 13th Annual Conference of the American Society of Automotive Engineers was held in New York City on Jan. 9th-10th.

The most important topic before the Professional Session, also held on Jan. 10th, the "Reasons Behind the Liberty Aircraft Engine," gave plentiful room for discussion at all points, and the three addresses were followed by half an hour of questions from the floor, which were answered by Major Jesse G. Vincent, formerly Vice-President of the Packard Motor Company, who, with Major Hall, of the Hall Scott Company, was called into the Reserve Engineering Service, and designed the Liberty motor.

[The glowing official account of the labours of these two gentlemen, which resulted in the production of the designs of the Liberty Engine in 36 hours, or some such period, will be within the memory of readers of this paper.—Ed.]

The account of performance and production possibilities given by the speakers seemed to bring general satisfaction, but what put the final touch on the general conviction, apparent among most of the engineers, that the Liberty motor was actually living up to its promises, was the statement made at the close of the discussion that several of the Allied Governments have placed orders in this country for the motors.

[No indication appears to have been given of the numbers ordered. After all, one sample engine, intended to be run to destruction as an experiment, constitutes an order.—Ed.]

Much information about production had to be withheld for military reasons, and figures as to the actual speed which the motor will develop were not given for the reason that the designers of the engine were careful to point out that the planes themselves are a very important factor in this consideration.

[A very interesting discovery, indicating that the American Aircraft Production Board is beginning to understand that important question, "What is an aeroplane?" or perhaps the other, equally interesting. "What is the difference between an aeroplane and an airplane?"—Ed.]

The following points as to the Liberty motor were brought out in the course of the afternoon's discussion :

1. The primary consideration in design was the meeting of the known possibilities of production by American factory methods. Certain features of foreign engines, the building of which required highly specialised factory technique such as was not compatible with quantity production, would be impossible for use in the enormous number of aeroplanes which is contemplated by the American aircraft programme. The designers had to consider the present capacities of production in American factories by American methods, as well as the possibilities of increase.

2. All the engineering talent in the American aeroplane and automobile industries was placed at the disposal of the Government, so that when Majors Vincent and Hall settled down to the completion of the design they had available all the information possessed by American manufacturers and the researches previously made by some 40 or 50 other engineers. The motor which resulted is said by those who were engaged in its design to combine the best points of all motors hitherto designed in America.

[Which is not necessarily a testimonial to its originality or its inherent merits.—Ed.]

3. Although the possibility of production was the first desideratum, it is asserted that the Liberty motor is as good as, if not better, than any foreign engine now being built. When the work of designing the new motor was just begun the Allied Governments were asked for suggestions from the engines now in use in their aircraft. All of the major Allies replied that they were severally engaged in developing a new and better motor. In consequence, with the aid of such suggestions from Allied sources as were of use and those contributed by the American engineers, the designers set to work to build an engine which should embody all the improvements likely to be thought of abroad during the period of design and construction. They feel confident that when the Liberty motors are actually in use on the Western front there will be no foreign motor of equal worth in use.

[The charming modesty of this statement disposes once and for all of the statement by a mere practical American aero-engine mechanic that "the United States of America is now engaged in piling up the World's Record Junk Heap." Meantime, one would merely indicate that if the Liberty motor is to beat one or two of the latest British products it will have to "go some."—Ed.]

4. Liberty motors are now being turned out and American aeroplanes are being equipped with them every day. When the tide of production is in full swing they will be wholly standardised, but at present, while standardisation is in effect with regard to most parts, a few must for a little time to come be made individually because the master gauges are not ready for all factories.

5. Although it was not definitely taken up in the meeting, it was declared afterward by the chairman, Charles M. Manly, vice-president of the society, chief inspecting engineer of the Curtiss Aeroplane and Motor Company, and a member of the National Aircraft Standards Board, that every possible provision is being made for the improvement of the design with the least possible interference with production. Aeroplanes are rapidly being improved, of course, by the interchange of captured machines with new devices between the opposing armies, but the men who are in charge of the Government's aircraft programme are said to feel that the system of production will make it possible to introduce new features or improvements on later lot orders so that the Government will never be tied up with a great number of obsolescent machines in process of manufacture.

Later, Major Vincent declared he believed that with all the alterations that might be necessitated by subsequent experience, 95 per cent. of the present features of the Liberty motor would be retained.

[One hopes that Major Vincent will be justified of his hopes of his offspring, but there is such a thing as counting chickens before they are hatched, and imagining geese to be swans.—Ed.]

6. "Many thousands" of Liberty motors will be turned out in the year 1918, and American factories will be able to produce at least twice as many per week as they would be able to manufacture of any foreign type of engine.

The Liberty motor is to be used on machines of every type—speed scouts, battleplanes, observation and bombing machines, and seaplanes, though those at present in process of manufacture, according to Major Vincent, are intended only for heavy battle and bombing planes.

[It would be interesting to know whether Major Vincent has ever seen a "heavy battleplane," because the type is not common in Europe, even in the most advanced aerial services.—Ed.]

There are only two varieties—a high-pressure engine for the use of battleplanes at very high altitudes, where the atmosphere is rarefied, and a low-pressure motor for the use of seaplanes working principally in the detection of submarines, and hence near sea level, where the air pressure is heavy.

As showing the endurance of the motor it was said that the high-pressure engine designed for use three or four miles in the air had been run consecutively for eight hours at sea level without showing any weakness.

In the vacuum chamber of the Bureau of Standards in Washington, where conditions of temperature and air pressure obtaining 35,000 feet in the air—two miles higher than any aviator has ever flown—can be simulated, the high-pressure Liberty motor has been run for 50 consecutive hours. This, of course, is longer than any possible flight, for no aeroplane could carry enough gasoline.

[There is, however, some difference between a partly throttled test on a bench and a full-bore run at varying levels and speeds in the course of an air fight.—Ed.]

Incidentally it may be remarked that improvements in the propeller are part of the plan of inventors now working on the improvement of the engine. It weighs about 800 pounds.

[It seems that by the time all these standardised thousands begin to come through, it will be well for Major Vincent to come to England and learn the latest ideas abour engine weights.—Ed.]

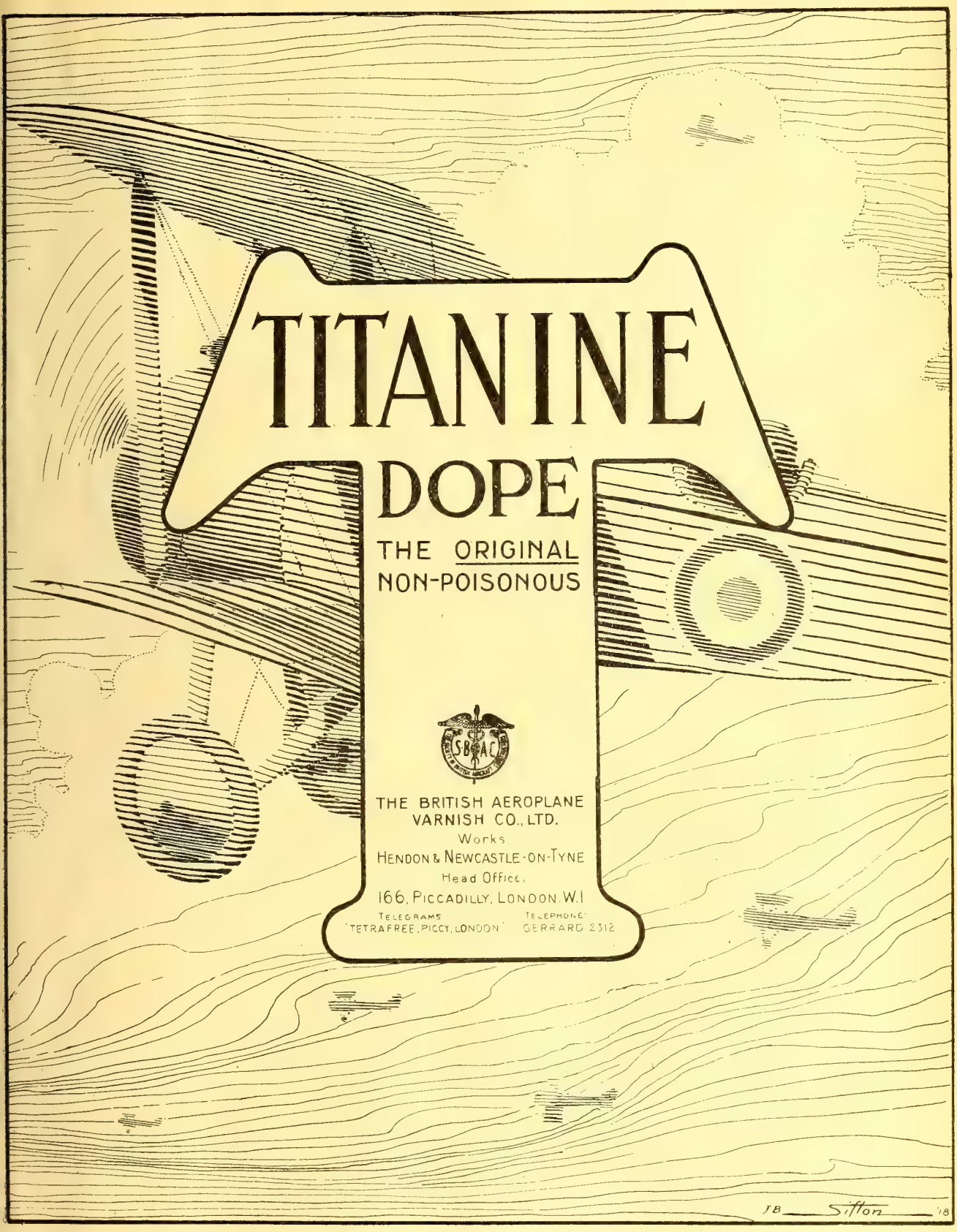
Questions from the floor were aimed at a comparison of this with the Rolls-Royce motor, regarded as one of the best of foreign design. Major Vincent said that the Rolls-Royce, with a weight of 950 pounds, had never authentically developed more than 360 horse-power. Someone asked if it were not true that the Rolls-Royce could really do better than that. "I don't know," he said, "but I do know that the Liberty motor can do 50 horse-power better than the Rolls-Royce. As a matter of fact, the Liberty motor has possibilities which have not been completely fathomed as yet. We have something up our sleeve."

[A new engine, one hopes.—Ed.]

The average of only two pounds weight per horse-power, according to Major Vincent, was something that Continental designers had desperately tried for and failed.

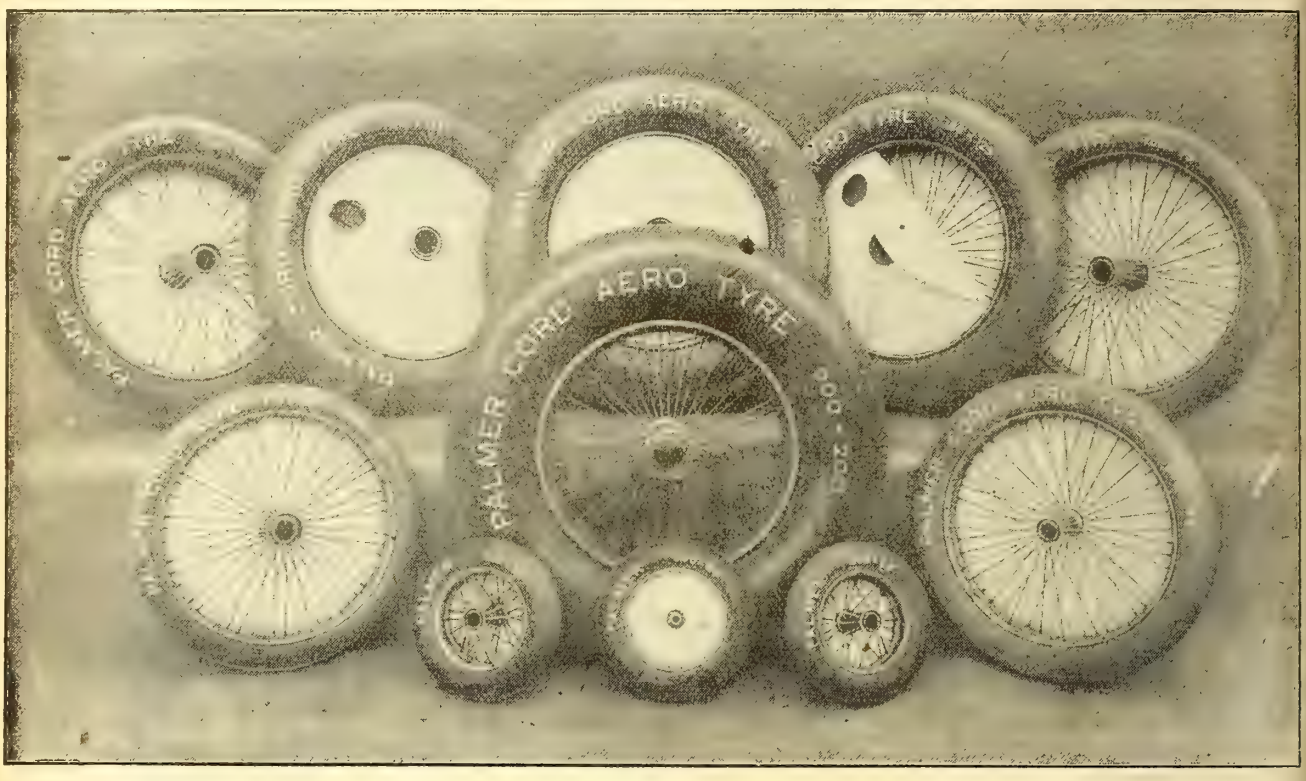
H. M. Crane, who as chief engineer of the Wright-Martin Company is manufacturing the Hispano-Suiza motors in this country, followed Major Vincent and corroborated his statement that the Liberty motor was best adapted to American production. "It will answer for all the requirements of the war," he said, "and after the war will be a factor in the remaking of the whole automotive industry. We have to begin to think now of what we are going to do after the war is over."

[Does Mr. Crane indicate the fitting of Liberty engines into Ford chassis?—Ed.]


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
S.B.A.C.
THE BRITISH AEROPLANE
VARNISH CO., LTD.
Works
HENDON & NEWCASTLE-ON-TYNE
Head Office,
166, PICCADILLY, LONDON, W.1
TELEGRAMS
"TETRAFREE, PICCY, LONDON"
TELEPHONE
GERRARD 2312
J B Sifton '18

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
300×60	16	111.12	25.4	Central
,,	17	72.39	12.7	Central
450×60	30	89.	31.75	Central
575×60	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
650×65	78	178.	44.45	132/46
,,	79	178.	44.45	Central
,,	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
600×75	21	160.	28.	Central
,,	34	150.	31.75	104/46
,,	111	150.	38.09	104/46
700×75	78	178.	44.45	132/46
,,	79	178.	44.45	Central

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
700×75	100	178.	38.09	132/46
,,	101	178.	31.75	132/46
700×100	33	150.	38.09	Central
,,	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	93	150.	40.	Central
,,	95	185.	55.	Central
,,	96	178.	55.	132/46
,,	99	178.	38.89	132/46
650×125	119	178.	55.	132/46
750×125	33	150.	38.89	Central
,,	77	178.	44.45	132/46
,,	92	185.	55.	135/50
,,	93	150	40.	Central
,,	95	185.	55.	Central
,,	96	178.	55.	132/46
,,	99	178.	38.09	132/46

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m
800×150	†36	185.	55.	135/50
,,	†40	185.	60.32	135/50
,,	82	185.	55.	135/50
,,	85	185.	55.	Central
1000×150	97	250.	65.4	Central
,,	102	185.	55.	125/60
,,	201	185.	60.32	125/60
900×200	39	185.	55.	Central
,,	42	185.	60.32	125/60
,,	47	185.	55.	125/60
,,	202	185.	60.32	Central
1100×200	52	185.	55.	116/69
,,	57	185.	55.	Central
,,	203	185.	60.32	116/69
,,	204	185.	60.32	Central

†*Wheels Nos.* 36 *and* 40 *are of stronger type than the other wheels for* 800×150 *tyres.*

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

AIRCRAFT MANUFACTURING COMPANY——————LIMITED

Contractors to

War Office and Admiralty

London Office

27, BUCKINGHAM GATE, S.W.1.

Offices & Works

HENDON, N.W.9.

The Hollow Structure and Aircraft Co., Ltd., Patents applied for.

WOOD PROBLEM SOLVED.

HOLLOW SPARS

And Struts for all types of machines.

Any length, shape or section without joints.

FULL PARTICULARS FROM THE SOLE LICENSEES,

ROBERT YOUNG'S CONSTRUCTION CO., LTD.,

AIRCRAFT CONTRACTORS,

CANONBURY WORKS, ESSEX ROAD, LONDON, N.

TELEPHONE—
DALSTON 2985.

TELEGRAMS—
BYLDINCONT NORDO LONDON."

HANDLEY PAGE
LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines).

"HYDROPHID, CRICKLE," LONDON

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

ARNOTT-&-HARRISON Ltd



Telephone— WILLESDEN 2297 (2 lines).
legrams— ARNOTHARRI, LONDON.

SPECIALISTS IN ALL
DE HAVILLAND
METAL FITTINGS
UNSURPASSED FOR
PROMPT DELIVERY.

Hythe Rd., WILLESDEN JUNCTION, N.W.10.

"A & H" SMALL PARTS TO THE RESCUE.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street Works, BIRMINGHAM.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome
and
The GRAHAME-WHITE School of Flying.

Telegrams:
VOLPLANE, HYDE, LONDON.

Telephone:
Kingsbury 120 (5 lines).

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co Ltd

CONTRACTORS TO H.M. GOVERNMENT.

Designers and Manufacturers of all Types of Aircraft for Overland and Oversea Purposes, Flying Boats, etc.

Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

Aviation Works & Offices - **229-231, Hammersmith Road, W.**
Engineering Works - - **King Street, Hammersmith.**
Airscrew Works - **Ravenscourt Park, W.**

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

The "Guardian Angel" Parachutes

THE GUARDIAN ANGEL PARACHUTES
TRADE MARK
(REGISTERED)

THE CLASS OF OUR LIFE-SAVING EQUIPMENT.

The basic characteristics of our Parachutes, which differentiate them from all others, and for which we hold master-patents, are automatic (i.e., compellative) opening, and static and kinetic control (i.e., control at rest and in action) of all their component details. The ordinary parachute is under no sort of control, and what we have accomplished is to convert this most insubordinate Apache of the Air into a staid servitor, incapable of acting in any other than the designed way. We have made the Parachute into an automatic machine, so that failure to open and entanglement of rigging has become a physical impossiblity. Every Type of Parachute made by us possesses these paramount and indispensable principles of machine action. The aviator makes his jump, and the Parachute automatically does the rest.

THE RANGE OF OUR LIFE-SAVING EQUIPMENT.

Life-saving Parachutes for school machines on the Training Grounds.

Life-saving Parachutes for heavy bombing machines, fighters, and scouts.

Life-saving Parachutes with minimum weight and without additional air resistance for the fastest machine that flies, and capable of release from any vertical or horizontal angle, or when flying upside down.

Solo-Parachutes for use from Airships and Observation Balloons, with a high but constant-speed initial drop from a fired gas-bag, automatically opening into the low-speed descent required for a safe landing.

Basket-Parachutes for instantly detaching the basket containing two observers, their instruments and records, from a fired gas-bag, with high-speed initial fall, changing automatically to slow-speed descent for the safe landing. Parachute instantly released on landing, to avoid dragging the basket.

Variable-speed Parachutes, to permit a sudden high-speed drop, controlled by the Parachutist, to escape from an enemy aeroplane, and to stop on any portion of the grade of descent to avoid an objectionable landing. This variable-speed apparatus is applicable to the whole range of our Parachutes.

Non-spinning shock-absorber slings, taking all shocks off Parachute and man.

Aviator's Harness, distributing the stresses over those parts of the body best able to sustain them, and instantly releasable when alighting on land, on a roof, in a tree, or in water.

OUR EQUIPMENT IS THE RESULT OF ENGINEERING SCIENCE APPLIED TO DIFFICULT AIR PROBLEMS. WE BELIEVE THAT ITS EXTENDED USE WILL DOUBLE THE FLYING LIFE OF OUR FIGHTERS AT THE FRONT.

RELIABILITY—First. RELIABILITY—Second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S AERIAL PATENTS, LTD.

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines): London Wall 3266 and 3267. Telegraphic and Cable Address: "Savemalivo-Ave-London."

Contractors to H.M. Admiralty, War Office and Foreign Governments

The BRITISH CAUDRON CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office and Works:

BROADWAY, CRICKLEWOOD, N.W 2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 4647 4648 HAMPSTEAD

Scottish Factory and Aerodrome:

ALLOA.

Cable and Telegraphic Address: "CAUDROPLAN, ALLOA." Phone: 52



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London. Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickie, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 012.

Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.

National Aircraft Co., Ltd., 15, Hackney Road, N.E.2. London Wall 6725

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.

Short Bros. Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 744.

Standard Aircraft Manufacturing Co., Effingham House, Arundel Street, W.C.2. "Gunsignrush, Estrand, London." City 89.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships— Wimbledon 1314.

Airships, Ltd., High Street, Merton

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand & Die)

Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 2846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 695, 696, and 7096.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Capstan Work—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

London Label Co., Beckton Road, E.16. "Lonlabel, Canning, London." East 1300

Clothing—

Burberry's, Ltd., Haymarket S.W.1. Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (4 lines).

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728. "Aviduction, Phone, London."

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

The Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aerocracons, Canning, London" East 1306.

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, L. & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.

The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.

Celion, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622.

Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith Iron Works. Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1910

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3996.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654-5-6.

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Sunbeam Motor Car Co., Ltd., Wolverhan "Moorfield, Wolverhampton." Wolverhampton

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Eleve London." Walthamstow 408 (2

Electrical Accessories—

Belling & Co., Derby Road Works, Mont Road, Upper Edmonton, N.18. "Be Edmonton." Tottenham

Johnson & Phillips, Ltd., Charlton, Lon S.E.7. "Juno, London." Central 2207, London Wall

Mann, Egerton & Co., Ltd., 177, Clev Street, London, W.1. "Installing, road, London." Museum

Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. renheit, Birmingham." Midland

The Rotax Motor Accessories Co., Ltd., toria Road, Willesden Junction, N.W "Rodynalite, Phone, London." Willesden

E. Kalker & Co., Coventry. "Kalker, Co try." Coventry

Johnson & Phillips, Ltd., Charlton, Lon S.E.7. "Juno, London." Central 2207, London Wall

Electric Lighting and Powe

E. Stanley Fardon, A.M.I.E.E., 67, Mo Street, Manchester.

Johnson & Phillips, Ltd., Charlton, Lon S.E.7. "Juno, London." Central 2207, London Wall

Electro Platers and Me Polishers' Engineers—

W. Canning & Co., 133-137, Great Ham Street, Birmingham. "Materials, mingham. Birmingham 3622 Central (3 li

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, don, S.W.1. "Edibrac, 'Phone, Lond 3540 Victoria (3 li

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redd "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot lage, Bournemouth. "Etches, Winton. Bournemouth 1

Cambridge School of Flying and Aerodrome 308, St. Andrews St., Cambridge, bon, Cambridge." Cambridge 5 and 1

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Paver House, London, E.C.2 London Wall 573 and 6

Galvanising—

Boulton & Paul, Ltd., Rose Lane Wo Norwich. "Aviation, Norwich." Norwich

The Rustless Iron (Cowper Coles Proc Ltd., 1, French St., Sunbury-on-Tha Middlesex. Sunbury

Gears—

Moss Gear Co., Ltd., Thomas Street, As Birmingham "Mosgear, Birmingham.

Glue— East

Central Chemicals, Ltd., 283, West End L London, N.W.6. "Entramical, Westha London."

Improved Liquid Glues Co., Ltd., Gt. He tage Street, E. (Croid.). "Excroi Wapp, London." Avenue 3

Mendine Co., 8, Arthur Street, E.C. Bank 5

Oldroyd, Wm., & Sons, Ltd., 9, Mincing L

Goggles— E.

Triplex Safety Glass Co., Ltd., 1, Albem Street, Piccadilly, W.1. "Shatterlys, Pi London." Regent 1

Gauges—

J. A. Prestwich & Co., Northumberland P Tottenham, N.17.

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & Southwark Street, London, S.E.1. "Kinn London." Hop 372 (2 lin

Hollow Spars—

McGruer Bentwood Hollow Spar Co., C mercial Wharf, Lambeth, S.E. "Gabr son, Watloo, London." Hop

Robert Young's Construction Co., Ltd., Can bury Works, Canonbury Street, Essex London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery La W.C.2. Holborn 1

Instruments (Scientific, A meters, etc.)—

The Cambridge Scientific Instrument Co., L Cambridge. "Instrument, Cambridge Cambridge

Short & Mason, Ltd., Macdonald Ro Walthamstow, E.17. "Aneroid, Pho London." Walthamstow

Buyers' Guide.



hine Tools—

ewster & Co., 11, Queen Victoria Street, E.C.4. "Circumiuse, Cannon, London." City 768.

neto Driving Pieces—

rbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61

netos—

tish Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-1009.

British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicksmig, Phone, London." Museum 430

esson Manufacturing Co. (Berling Magneto), Buffalo, N.Y., U.S.A.

al Manufacturers—

Ford, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham." Central 42-43.

als in General—

Avenue 1432

hrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

tt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 0[illegible], 0[illegible], and 7006

uel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

al Parts and Fittings—

les & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

craft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 "Upcast, Rand, London." Gerrard 276 (2 lines).

ott & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2207.

liss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.

Birmingham Guild, Ltd., 45, Gt. Charles Street, Birmingham. "Handicraft." Central 3705.

ckburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

tish Metal (Kingston), Ltd., Kingston-on Thames.

hrie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

nbard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

n. Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston Road, London." Museum 70.

ntford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261.

ertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3996.

pery, Owen, & Co., Darlaston South Staffs.

key, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.

Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.

Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Aircraft Construction Co., Harley Works, Beckton Road, E.16. "Aercracons, Canning, London" East 1300

Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

al Shearing Tools—

ntgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

al Spinnings—

nold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

briel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham." Central 1223.

ric Bolts—

shmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.

bery Owen & Co., Darlaston, South Staffs.

cellaneous—

derson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

wden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

itish Metal (Kingston), Ltd., Kingston-on-Thames.

own Bros., Ltd., Great Eastern Street, E.C.2. "Imbrowned, Bethroad, London." London Wall 6300.

erbert Flood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

London Label Co., Ltd., Harley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.

MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.

The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemaiivo, Ave, London." London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry." Coventry 723

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Power Presses and Dies—

Bliss, E. W., & Co., 22a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 6, Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3473.

Shackles—

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines)

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4850.

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4850.

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 255.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758

Springs—

Dart Spring Co., West Bromwich. "Dart-West Bromwich." West Bromwich 322.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Steel—

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meeloo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1., And at Glasgow City 3115.

James North Hardy & Son, Ltd., 54, Portland Street, Manchester. "Hardson, Manchester." Central 6471.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Eatikosil, Vic, London" Victoria 5073, 4210.

Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton" Nottingham 1526

J. Owen & Sons, Ltd., 1094, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The · Aeroplane · Buyers' · Guide.



Acceptance and Experimental Flights -
The Pashley [illegible] Aviation Co. "Aeronmi [illegible]" [illegible] London Gerrard 278 (2 lines)

Acetylene Welding Plant—
Acetylene Corporation of Great Britain Ltd., [illegible] Victoria Street, Westminster, S.W. [illegible]
Imperial Light, Ltd., 123, Victoria Street, London, S.W. [illegible]

Aeroplane Manufacturers -
Aircraft Manufacturing Co., [illegible] Hendon "Airmanship, Hyde, London" Kingsbury 180
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne "Armstrong [illegible] Newcastle-on-Tyne" [illegible]
Blackburn Aeroplane & Motor Co., Ltd., [illegible] Road, [illegible] (3 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd., [illegible] Bristol Co., Filton, Bristol "Aviation Bristol" [illegible]
British Caudron Co., Ltd., Broadway, Cricklewood, N.W. "Caudroplan [illegible]" [illegible] London"
Central Aircraft Co., [illegible] Road, [illegible] N.W. [illegible]
Davidson [illegible] Hammersmith [illegible] (3 lines)
Eastbourne Aviation Co., Ltd., [illegible] Eastbourne [illegible]
Grahame-White Aviation Co., Ltd., [illegible] Aerodrome, Hendon [illegible] London [illegible]
Handley Page, Ltd., 110, Cricklewood Lane, N.W. "Hydrophid Crickle London" [illegible]
Hooper & Co., Ltd., 54, St. James St., Piccadilly, London, S.W. "Sociable St. James London" [illegible]
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich [illegible]
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge" Woking 331; Byfleet 171
National Aircraft Co., Ltd., 15, Hackney Road, N.E. London Wall 6725
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W. "Nieuscout, Cricklewood, London" Willesden 2455
Norman Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48
The Regent Carriage Co., Ltd., [illegible] King's Road, Fulham, S.W. "[illegible]" Putney 2230-2231
Roe, A. V., & Co., Ltd., Manchester "Triplane, Manchester" City 8530-8531, Manchester
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested 'Phone, London." Regent 378
Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 724
Standard Aircraft Manufacturing Co. (Cunningham House, Arundel Street, W.C.) "Gunsignush, Estrand London" City 80
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W. "Vickersia, Knights London" Kensington 6810
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London" Museum 5000.
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 129
White, J. Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond, Surrey "Whitecraft, Richmond Surrey" Richmond 1865
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84

Airships -
Airships, Ltd., High Street, Merton Wimbledon 1314
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested 'Phone, London" Regent 78

Aluminium Castings (Sand & Die)
Coan R. W., 210, Goswell Road, London, E.C. "[illegible] Islington, London" City 5846

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds" Central 3027

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C. 3 "Posters Fen London" Avenue 605, 606 and [illegible]

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation Norwich." Norwich 851
Palmer, F. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1113
Rubery, Owen & Co., Darlaston, South Staffs.
The Willey Co., Ltd., Salisbury House, London Wall, E.C. 2 "Wrenlysia" Phone, City 2782

Cable Coverings and Cable Controls -
[illegible] & Sons, Ltd., Redditch [illegible] Redditch [illegible]

Capstan Work—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070

Casein -
Newland Sur[illegible] & Co., Ltd., [illegible] Lloyds Avenue, London, E.C. 3 "[illegible] London" Avenue 34 and 35

Castings -
Gabriel & Co., 4 and 5, A B Row, Birmingham [illegible] Central 1223

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Celluloid (Non Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenhill, London" Central 15007
London [illegible] Co., [illegible] Road, [illegible] London" [illegible] 1300

Clothing—
Burberrys, [illegible] Haymarket, S.W. Regent [illegible]
Dunhill, Ltd., Euston Road, N.W. "Dun [illegible] London" North 3405-6

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Central Aircraft Co., Palmerston Works, High Rd. Kilburn, N.W.6 Hampstead 4728 "Aviation 'Phone London"
P D V Aircraft Co., Ltd., Princes Street, Richmond "Acros Richmond" Richmond 1681
The Aircraft Construction Co., [illegible] Works, Beckton Road, E.16 "Aeroncons, Canning Town London" East 1101
Thompson Bros. (Bilston), Ltd. Bradley, Bilston, England "Thompson Bros. Bilston" Bilston 10

Cords, Tapes, and Threads—
MacLennan, J., & Co., 39, Newgate Street, E.C. and at Glasgow City 3115

Dopes -
British Aeroplane Varnish Co. Ltd., 161, Piccadilly, W. "Tetrafree, Piccy, London" Gerrard 2312
British Cellulose Co., 8, Waterloo Place, S.W. "Cellulite London" Regent 4046
The British Emaillite Co., Ltd., 30, Regent Street, S.W. "Ridlespren, Piccy, London" Gerrard 280
Cellon, Ltd., Broad Street House, New Broad Street, E.C. 2 "Ajawa, London" London Wall 5350 3022
Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand" Regent 3923

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford" Bedford No. 1
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-282
The Beatty School of Flying, Ltd., The Broad Way, Cricklewood, N.W. 2 Hampstead 3000
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W. "Beardmore London"
Dudbridge Iron Works, Ltd. (Siddeley), Gerrard 238 [illegible] Victoria Street, London, S.W. 1 "Aero flight, Vic. London" Vic. 7026
Gordon Watney & Co., Ltd., Weybridge "Mercedes, Weybridge" Weybridge 330 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1293
Gwynnes, Ltd., Hammersmith Iron Works Hammersmith, W. "Gwynn, Hammersmith" Hammersmith 1310
Napier, D., & Son, Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London" Gerrard 8926
Roberts [illegible] & Co., 1, Albemarle Street, London, W. Regent 3900
Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolhead, London" Gerrard 1654-5-6
The Sclerco Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W. "Sclerco, Phone, London" Regent 1181

Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" [illegible]
The Gnome & Le Rhone Engine [illegible] [illegible]

Electrical Accessories—
Belling & Co., [illegible] Road, [illegible] Edmonton [illegible]
Johnson & Phillips, Ltd., Charlton, S.E. 7 "Juno, Lond" [illegible]
Mann, Egerton & Co., London [illegible] Street, [illegible] road, London [illegible]
Premier Electric Heaters, Ltd., 245, [illegible] Birmingham [illegible]
The Rotax Motor Accessories Co., Ltd., [illegible] Road, [illegible] "Rodrunite, [illegible]"

Electric Cables
E. Kolker & Co., Coventry [illegible]
Johnson & Phillips [illegible]

Electric Lighting and Power
[illegible]
Johnson & [illegible]

Electro Platers and Metal Polishers' Engineers
W. Canning & Co., [illegible] Great Hampton Street, Birmingham "[illegible] Birmingham" Birmingham 3622 Central

Flare Lights
[illegible] London, S.W. "[illegible]" [illegible]

Flexible Shafts—
Herbert Terry & Sons, Ltd. "Springs, Redditch" Redditch [illegible]

Flying Schools—
Bournemouth Aviation Co., Ltd., [illegible] lage, Bournemouth "Lichet, Winton" Bournemouth [illegible]
Cambridge School of Flying and Aerodrome, 308, St. Andrews St., Cambridge [illegible] Cambridge 5 and [illegible]

Furniture (Office) -
Cooke's (Finsbury) Ltd., [illegible] House, London, E.C. London Wall 573 and [illegible]

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation Norwich" [illegible]
The Rustless Iron Co., [illegible] French St., Sunbury, Middlesex.

Gears—
Moss Gear Co., Ltd., Thomas Street, Birmingham "Mosgear, Birmingham" [illegible]

Glue—
Central Chemicals, Ltd., 283, West End Lane, London, N.W. 6 "Entramical, [illegible] London"
Improved Liquid Glues Co. Ltd., [illegible] tage Street, E. (Croud.) "[illegible] Wapp, London" [illegible]
Mendine Co., 8, Arthur Street, E.C. [illegible]
Oldroyd, Wm., & Sons, Ltd., 9, Mincing [illegible]

Goggles—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W. "Shatterless [illegible]" Regent [illegible]

Gauges—
J. A. Prestwich & Co., Northumberland Park, Tottenham, N. 17 [illegible]

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65, 65a, Southwark St., London, S.E. 1 "[illegible] London" Hop 362 [illegible]

Hollow Spars -
McGruer Bentwood Hollow Spar Co. [illegible] mercial Wharf, Lambeth, S.E. "[illegible] Walloo London"
Robert Young's Construction Co., Ltd., Canonbury Works, Canonbury Street, [illegible] London, N.

Instruments—
British Wright Co., Ltd., 35 [illegible] W.C. [illegible]

Instruments (Scientific, meters, etc.)—
The Cambridge Scientific Instrument Co., Cambridge "Instrument, Cambridge" [illegible]
Short & Mason, Ltd., Walthamstow, E. 17 "Aneroid, Walthamstow" [illegible] London"

[illegible]ine Tools—
[illegible] & Co., [illegible] Queen Victoria Street, [illegible] Cannon London" City 768

[Ma]gneto Driving Pieces—
[illegible] & Sons, Ltd., Redditch [illegible] Redditch

[Ma]gnetos—
[illegible] Ltd., Lower Ford [illegible] Coventry" [illegible]
[illegible] Coventry 1005-1009
[illegible] Lighting & Ignition Co., Ltd., [illegible] Road, W. "Vicks [illegible]" Museum 430 [illegible] (Berling Magneto).

[Met]al Manufacturers—
[illegible] Birmingham [illegible] Central 2243

[Met]als in General -
[illegible] Mark Lane, E.C. 3 [illegible] Street, London, [illegible]
[illegible] & Co., [illegible] Upper Thames [illegible] Rehoncided, Cannon, City 6342

[Met]al Parts and Fittings—
[illegible] Birmingham [illegible] House, 1-5, [illegible] "Upcast, Rand, [illegible]" Gerrard 270 (2 lines)
[illegible] Wolverhampton [illegible] Bayliss, Wolverhampton [illegible] Wolverhampton 1041
[illegible] 43, Gt. Charles [illegible] Central 3703
[illegible] Motor Co., Ltd., [illegible] Leeds [illegible]
[illegible] Metal (Kingston) Ltd., Kingston-on-Thames
[illegible] B & Son, 40, St. Mary Axe, E.C. 3, Avenue 1432
[illegible] Lombard Street, Birmingham "[illegible] Birmingham." Midland 211 (2 lines)
[illegible] 177, Cleveland [illegible] "Lastilling, Euston London" Museum 70
[illegible] Ltd., Tremo Works, Lift [illegible] Birmingham "Tremo, Birmingham" Kings Norton 261
[illegible] J. H., & Co., 1, Albemarle Street, [illegible] Regent 3006
[illegible] Owen & Co., Darlaston, South Staffs
[illegible] & Sons, Ltd., Wellington, [illegible] "Sankey, Wellington, Salop" Wellington 66
[illegible] Engineering Co., Ltd., 10 to 16, [illegible] Street, High Holborn, London, W.C. 1 [illegible] London" Holborn 410
[illegible] Co., Ltd., [illegible] Albemarle Street, Piccadilly, W. 1 [illegible] Phone, London" Regent 1181
[illegible] Works, [illegible] Canning [illegible] East 1300
[illegible] Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W. 10 "[illegible] Phone, London" Willesden 2480
[illegible] Bradley, Bilston, [illegible] Bilston 10
[illegible] Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W. 10.

[Met]al Shearing Tools—
[illegible] Smith, & Co., Ltd., Tangent [illegible] Keynsham, near Bristol "In[illegible]" Keynsham 21.

[Met]al Spinnings—
[illegible] Standard Works, Lawrence [illegible] Tottenham, N. 15 "Instruments, Tottenham" [illegible] 2370-1
[illegible] & Co., 4 and 5, A B Row, Birmingham "[illegible] Birmingham" Central 1223

[Met]ric Bolts—
[illegible] Works, Hildreth Street, [illegible] S.W. Battersea 415
[illegible] & Co., Darlaston, South Staffs.

[Mis]cellaneous—
[illegible] & Son, Ltd. (Roofs), Belfast "[illegible] Belfast" Belfast 4033-4034-4035
[illegible] Ltd., Willesden Junction, [illegible] London" Willesden 2100 (5 lines)
[illegible] (Kingston), Ltd., Kingston-on-[illegible]
[illegible] Ltd., Great Eastern Street, [illegible] London" London Wall 6100
[illegible] Ltd., [illegible] Birmingham" Central 703

London Label Co., Ltd., Harley Works, Beckton Road, E.16 "Sundrimont [illegible] flammable Celluloid" "[illegible] Canning, London" [illegible]
MacLennan, J., & Co., 39, Newgate Street, E.C. and at Glasgow "[illegible] Glasgow" City 3115

Motor Cars—
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 28, 82
Mann, Egerton & Co., Ltd., 370-372, Euston Road, London, N.W. "[illegible] London" [illegible]
Standard Motor Car Co., Coventry "[illegible] Coventry" [illegible]

Nameplates and Labels
British Metal (Kingston), Ltd., Kingston-on-Thames
The [illegible] Metal [illegible] Works, [illegible]

Observation Panels -
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W. "Shatterless, Piccy, London" Regent [illegible]

Parachutes -
L. R. C. [illegible] Street House, [illegible] London [illegible] "Saxemanise, [illegible] London" London Wall 3417 3207

Pattern Making -
Fredk. Ward & [illegible] and 8, Allsop Street, Upper Baker Street, W. Padd 4745

Piston Rings—
British Chuck & Piston Ring Co., [illegible] Rings, Coventry [illegible]

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N. 15 "Instruments, London" Tottenham 2370
[illegible]

Power Presses and Dies
[illegible] & Co., [illegible] Street [illegible] Road, London, S.E. [illegible] London" Hop 4311

Presswork—
Rubery Owen & Co., Darlaston, South Staffs.
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 67

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 335 (5 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Ebora Propeller Co., [illegible] & 12, Surbiton Park Terrace, Kingston-on-Thames "[illegible] Kingston" Kingston [illegible]
Integral Propeller Co., Ltd. "Ajprop, [illegible] London." Hendon [illegible] Kingsbury [illegible]
Lang Propeller, Ltd., Weybridge "Aerosticks, Weybridge" Weybridge 320-321
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (4 lines)
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds" Central 205, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120

Pyrometers—
The Foster Instrument Co., Letchworth, Herts
Foster Instruments, Letchworth Letchworth 26

Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England "Cradock, Wakefield" Wakefield 466

Rubber Tubing & Accessories—
Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C. 1 "Masticator, Isling, London" City 3811 and 3812

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester "Scuttle, Manchester" City 4432

Screw-driving Machines—
Russell Bros., Redditch, Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 335 (5 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 217
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (4 lines)
The Norman Thompson Flight Co., Ltd., Middleton, Bognor "Soaring Bognor" Bognor 48
Short Bros., Rochester "Seaplanes Rochester" Chatham 627
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 1337

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W. "Ldibrac, Phone, London" 3540 Victoria (3 lines)

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W. "Rodrunite, Phone, London" Willesden 2480

Seats for Aeroplanes -
Boswell [illegible], Art Cane Works, [illegible] Lane, [illegible] Central 3475

Shackles—
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W. "Rodrunite, Phone, London" [illegible]

Sheet Metal Pressings -
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N. 15 "Instruments, London" Tottenham 2370
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "[illegible]" [illegible]
W. H. Boswell & Co., Ltd., [illegible] Street, Birmingham [illegible]
Bristol Metal (Kingston) Ltd., Kingston-on-Thames
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
London Aero [illegible] Ltd. [illegible] Avro, [illegible] East 40, [illegible]
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W. [illegible]
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N. 15 "Instruments, London" Tottenham [illegible]
British Metal (Kingston) Ltd., Kingston-on-Thames
Gabriel & Co., 4 and 5, A B Row, Birmingham [illegible] Central 1223
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W. [illegible]
The Sclerco Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W. "Sclerco, Phone, London" Regent 1181
Arthur Hall & Co., Sidcup [illegible] Kensington [illegible]

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central [illegible]

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Ignition, Rugby" Rugby [illegible]
Ripon, [illegible] & Co., Ltd. (Oleo Plugs), 13, Poland Street, W. "Ripault, Regent, London" Gerrard 7755

Springs—
Dart Spring Co., West Bromwich "Dart West Bromwich" West Bromwich 322
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 67 (4 lines)

Stampings—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C. Avenue 1431
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N. 15 "Instruments, London." Tottenham 2370-1

Steel—
Firth, Thos., & Sons, Sheffield "Firth, Sheffield" Sheffield 3230 to [illegible]
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C. 3 Avenue 1431
Nicklin, Bernard & Co., Birmingham "Bernico, Birmingham" Smithwick 224

Steel Stamps and Markings—
John Morton & Sons, Cleveland Works, Cleveland Street, Mile End, E. "Dashur Phone, London" East 3331 (2 lines)

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Taper Pins—
Mountford, Ernest, (Birmingham), Ltd., Tremo Works, Lifford, Birmingham "Fremo, Birmingham" Kings Norton 261-262

Tapes and Smallwares—
MacLennan, John, & Co., 39, Newgate Street, E.C. and at Glasgow City 3115
James North Hardy & Son, Ltd., 54, Portland Street, Manchester "Hardson, Manchester." Central 6471

Timber -
Engineering Timber Co., Ltd., 6, Victoria Street, London, S.W. "Lanikosil, Vic. London" Victoria 5073, 4210
Brown, R. [illegible] & J. W., Walton Saw Mills, [illegible] "Brown's Saw Mills Nottingham" Nottingham 1326
J. Owen & Son, Ltd., 109a, Borough High Street, S.E. "Bucheron, London" Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10.

Varnishes—
The British Emaillte Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark, R. Ingham & Co., Walter House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Washers—
Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Herbert Terry & Sons, Ltd. Redditch. "Springs, Redditch." Redditch 61.

Vices—
C. and J. Hampton, Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Watchmakers and Jewellers
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines).

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.
London Label Co., Ltd., Hadley Works, Beckton Road, E.16. "Nonflamoid" Noninflammable Celluloid. "Lonlabel, Canning, London." East 1300.

Wire Gauze—
N. Greening & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

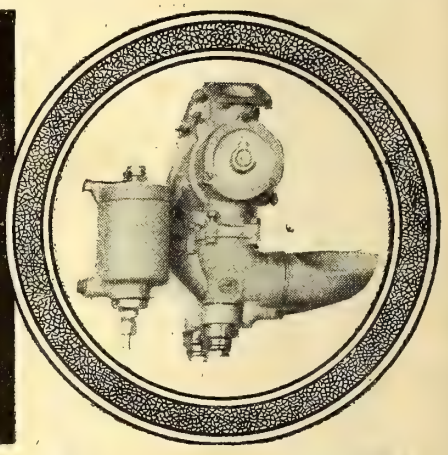
Wires and Cables (Aeroplanes)—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61

Wood Refuse Suction Gas Producers—
Ruston Proctor & Co., Ltd., Lincoln, England. "Ruston, Lincoln." Lincoln 580.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

Claudel-Hobson
CARBURETTERS
H. M. HOBSON, LIMITED
29, Vauxhall Bridge Road, London, S.W.1



WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

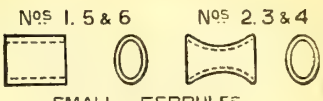
CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.


SMALL FERRULE.
PATTERN "A."

WE CAN SUPPLY
THESE AT ONCE


Nos 1. 5 & 6 Nos 2. 3 & 4
SMALL FERRULES
PATTERN "C."

IN VARIOUS GAUGES AND LENGTHS
- SEND FOR FULL PARTICULARS -

FERRULES FOR AIRCRAFT WORK

THE AEROPLANE STEEL TUBE AND PRESSWORK ARTIFICERS


SMALL FERRULE.
PATTERN "B."

ACCLES & POLLOCK LIMITED

OLDBURY BIRMINGHAM

Telegrams: "ACCLES," OLDBURY Telephone: OLDBURY 111 (4 lines
A.B.C. CODE, 5th Ed.


SMALL FERRULE
PATTERN "D"

SAMUEL MERCER & CO.,

Telegrams RECONCILED CANNON, LONDON

Proprietor—S. T. MERCER.

Telephone: CITY 6342.

Metals for Aircraft.



MILD STEEL SHEETS
SPECN. S3 & 9A.
Passed & Stamped A.I.D.

BEST CHARCOAL
TINNED & LEAD
COATED.

BLACK C/R and C/A
SHEETS.

GALVD. SHEETS.

BRASS AND COPPER
SHEETS.

SOLDER. INGOT TIN.

WELDING WIRE.

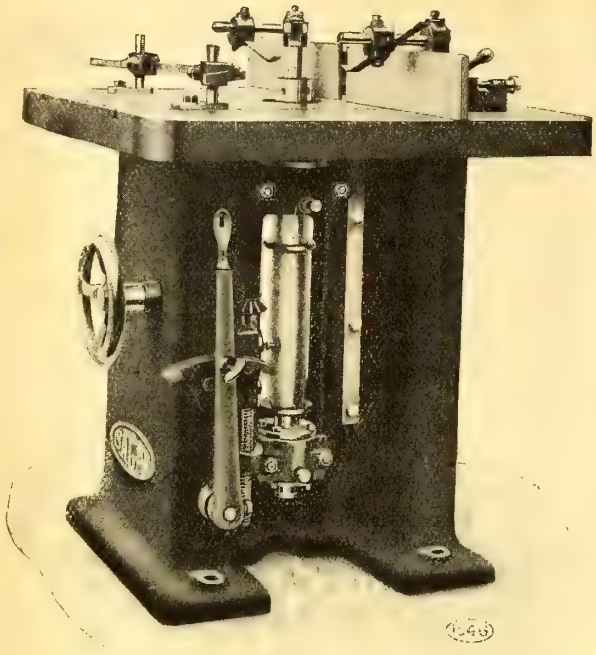
COPPER BITS, ETC.

LARGE STOCKS IN OUR
OWN WAREHOUSE.

Immediate Deliveries.

Manufacturers of Solder *for all purposes.*

198, UPPER THAMES ST., LONDON, E.C.4.



SAGAR

THIS ILLUSTRATION shows

OUR LATEST TYPE

Heavy Single Spindle Moulding and Shaping Machine

Spindle is exactly central with main Frame in all directions, and revolves in ROLLER BEARINGS.

Several other new features.

Fuller Particulars on request.

We make a complete line of Woodworking Tools for Motor Body Builders, Aircraft Constructors, etc., and shall be pleased to send full particulars of our manufactures to any one interested.

J. Sagar & Co., Ltd., Saw Mill Engineers, Canal Works, **Halifax,** Eng

LONDON OFFICE: 60, WATLING STREET, E.C.

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

TWO COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

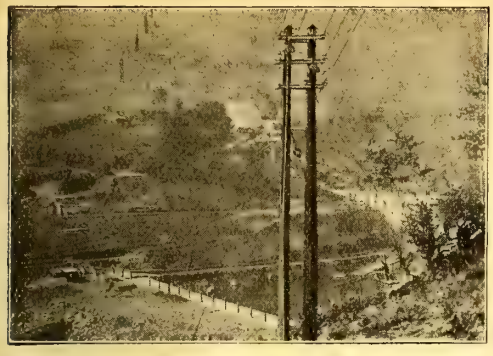
Addresses of our fine Saw Mills, Works, etc.,
— have been camouflaged by the Censor. —

Offices only: 141, CURTAIN ROAD, E.C.

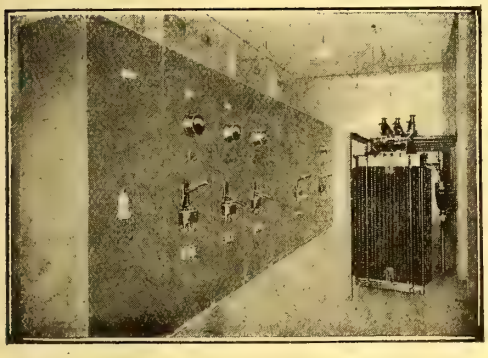
CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

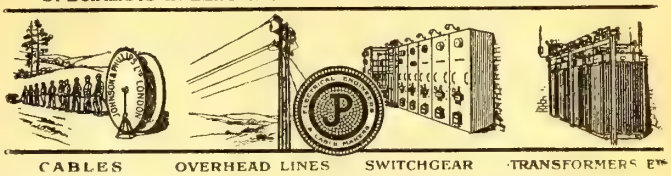


Electric Power Line.—Junction between Overhead and Underground Sections.



Switchgear and Transformers in Works Sub-Station.

SPECIALISTS IN ELECTRICAL TRANSMISSION AND DISTRIBUTION



CABLES OVERHEAD LINES SWITCHGEAR TRANSFORMERS ETC

ELECTRIC POWER

Please send us your enquiries for any Cabling or Overhead Line Work, Switchgear, Transformers, Motors, Lamps or Wiring Accessories.

We are large Manufacturers of all such Plant and Material.

Complete Installations contracted for.

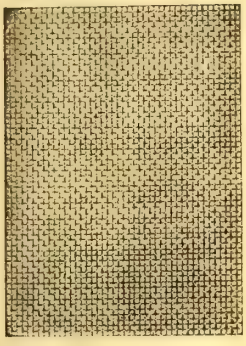
12, UNION COURT, OLD BROAD ST., LONDON, E.C. 2

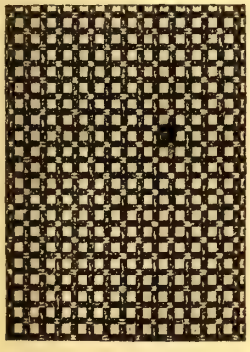
Telegrams "JUNO" London

JOHNSON AND PHILLIPS LTD
ELECTRICAL ENGINEERS & CABLE-MAKERS
CHARLTON, LONDON, S.E. 7.

Telephone No. 400 Woolwich

BIRMINGHAM 266, Corporation St. | CARDIFF 9, Park Place. | GLASGOW 159, W. George St. | MANCHESTER 251, Deansgate | NEWCASTLE-ON-TYNE 44b, Blackett St. | PORTSMOUTH Cleveland Rd. Cosham





AIR BOARD STANDARD PETROL GAUZE—CONTROLLED BY THE AIR BOARD.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY

N. GREENING & SONS, LTD. ESTABLISHED 1799.

LONDON WAREHOUSE—

16 FINSBURY STREET, E.C.2.

Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No.—LONDON WALL 1082.

WORKS - WARRINGTON.



NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

OFFICE AND WORKS—

LANGTON ROAD,

CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910. Grand Prix London, 1908, and Buenos Aires, 1910.

ENGINEERING EMPLOYERS' FEDERATION 1896

Telegrams JONAS, SHEFFIELD.

REGISTERED I C NOVO TRADE MARKS.

Telephone No. 4660. Private Branch Exchange.

S.B.A.C. The Society of British Aircraft Constructors

SIR JOSEPH JONAS, COLVER & Co., Ltd.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

INCREASED OUTPUT
DEMANDS
GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

The Wilfley Company, Limited
SALISBURY HOUSE, LONDON WALL, E.C. 2.

Telegrams: "Wrathless, Phone, London." Telephones: City 2681 & 2682.

To Works Managers and Buyers.—S.T.S.

SMALL TOOLS, Ex Stock.

PROMPT DELIVERIES.

Scroll Chucks.	High Speed Twist Drills	Milling Cutters.
Independent Chucks	Carbon Twist Drills.	Slitting Saws.
Drill Chucks.	Hand & Machine Reamers.	Taps and Dies.
Die Heads.	Centre Drills.	Shell Reamers.

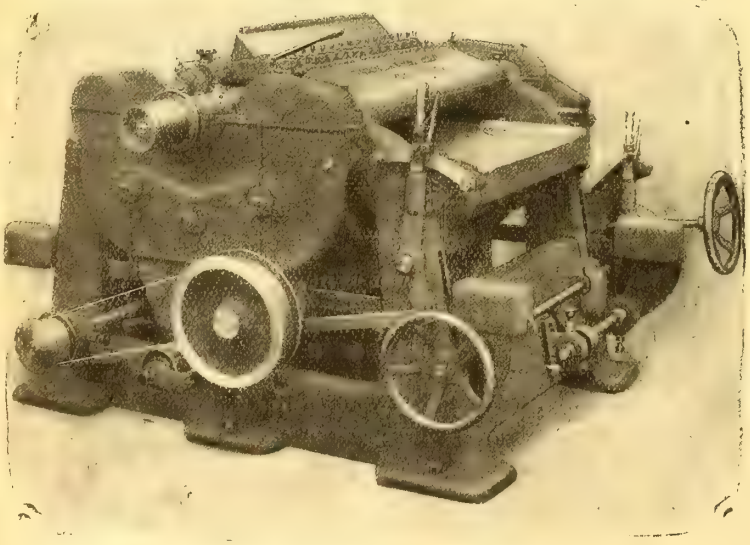
Quick Grip and Parallel Bench Vices, Machine Vices, Hand Screwing Machines.

WE GIVE PERSONAL ATTENTION TO ALL ENQUIRIES.
AVAIL YOURSELVES OF OUR PURCHASING ORGANISATION.

THE SMALL TOOLS SUPPLY CO., LTD.

AVENUE CHAMBERS, SOUTHAMPTON ROW, LONDON, W.C.

Telegrams: "Prosait," West-Cent., London. 'Phone: 2655 Museum.



AIRCRAFT MACHINERY.

Panel Planing & Thicknessing Machines for High-class Work

With Flexible Feed Roller and Chip Breaker, Tables on Inclined Slides and Patent Variable Feed Gear.

Type MZ.

WRITE FOR PARTICULARS.

Thos. Robinson & Son Limited
ROCHDALE

PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane from the current Official Patents Records :—

Patent Applications.

Balfe, L. H. G. Aircraft. No. 5577. April 2nd.
Coles, S. O. Cowper-. Doors for aircraft sheds. No. 5709. April 3rd.
Coles, S. O. Cowper-. Metallic propellers for aircraft. No. 5711. April 3rd.
Cooper, A. Q. Aircraft control. No. 5642. April 2nd.
Hathaway, W. E. Instrument for indicating level and angle of object to which it is attached. No. 5740. April 4th.
Hinchliff, A. O. Bomb-release mechanism for use on aircraft. No. 5605. April 2nd.
Leggelo, P. B. van. Aircraft. No. 5664. April 3rd.
McDonald, W. J. A. Level indicator for aircraft. No. 5727. April 3rd.
Mearns, H. Levels for aircraft, etc. No. 5850. April 5th.
Mearns, H. Levels for aircraft. No. 5853. April 5th.
Mond, A. Means for doping aeroplanes, etc., fabrics. No. 5619. April 2nd.
Morch, J. J. Means for mounting propellers for aircraft. No. 5799. April 4th.
Morch, J. J. Propellers for aircraft. No. 5800. April 4th.
Morch, J. J. Propulsion and control of aeroplanes No. 5801. April 4th.
Munroe, J. M. Bomb-dropping apparatus. No. 5703. April 3rd.
Nagele, K. Device for use in internal-combustion engines with rotating cylinders, for locating cylinder with faulty explosion. No. 5639. April 2nd.
Raybold, T. Aeroplane defence. No. 5608. April 2nd
Rose, W. Means for effecting release of bombs, etc., from aircraft. No. 5720. April 3rd.
Short, H. O. Aeroplanes. No. 5679. April 3rd.
Short, H. O. Hydro-aeroplanes. No 5680. April 3rd.
Stead, F. Apparatus for shaping propellers for aeroplanes. No. 5661. April 3rd.
Sykes, H. W. Interrupter gears for aircraft guns. No. 5748. April 4th.
Tarrant, W. G. Steering or controlling aircraft. No. 5813. April 4th.
Tarrant, W. G. Means for operating, stabilising, or steering devices of aeroplanes. No. 5814. April 4th.
Tarrant, W. G. Landing and launching carriages or chassis for aircraft. No. 5818. April 4th.
Tarrant, W.G. Landing-skids for aeroplanes, etc. No. 5882. April 5th.

Complete Specifications Accepted, prints of which can be obtained on and after April 25th, 1918.

114,329. March 22nd, 1917. Lines, J. R. Propelling aeroplanes and seaplanes.
114,341. March 26th, 1917. Harris, F. Aircraft attack instrument for directing the fire of anti-aircraft guns.

Abridgements of recently published Specifications.

113,158. Internal-combustion Engines. Carter, S., 5, Vicarage Road, and Hawkins, R. E., 160, May Lane, both in Kings Heath, Alcester Lanes End, Birmingham.

Two-stroke-cycle Engines.—In an engine for aircraft, etc., having radial cylinders revolving about a stationary crank-shaft, each cylinder is provided with an inclined air-induction scoop 7 facing in the direction of rotation and communicating with air ports 10 in the cylinder wall near the inner end, and an exhaust outlet in each cylinder head is controlled by a valve 12 and communicates with an exhaust chamber 18 having a mouth opening in the opposite direction to that of rotation. Each piston 4 is provided with radial ribs having passages 44 extending from the periphery and opening inside the piston near the centre, so that, as the piston passes the air ports, air rushes through the passages 44 and out through the hollow crank-shaft 1, cooling the pistons and preventing accumulation of oil. In the form shown, eight cylinders are arranged in one plane, the connecting-rods 5 being pivoted to lugs $3\times$ on the big end of the master connecting-rod 3, but the cylinders may be arranged in pairs, fours, or other groups working on separate crank-pins, the groups being in planes arranged side by side.

Valve-gear.—The exhaust valves 12 are actuated from a stationary eccentric 20, which acts on valve rods 25, slidable radially in the rim of a disc valve 36 secured to the revolving crank-case, through ball-bearing rings 32, 33, the inner ring 32 being fixed to the eccentric. The valve rods 25 are connected to levers 26 each having a set-screw 31 bearing against the end of the valve stem 14.

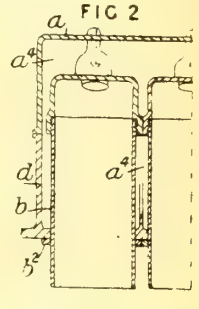
Regulating.—The crank-shaft 1 is fixed to the part 22 of the engine frame by screws 42 working in slots in the sleeve 21 of the eccentric 20, so that the eccentric can be turned slightly to regulate the portion of the circle at which the exhaust valves open and close.

Valves; Cylinders, arrangement of ports in.—Liquid or gaseous fuel is supplied by the distributing-valve 36 and pipes 50 to diverging passages 53, 54, Fig. 3, in a boss 51 on each cylinder. The valve 36 rotates in contact with a disc 48 having an inlet pipe 47 and an arc-shaped recess 51^1, Fig. 7.

Igniting.—The magnetos 60, 61 are driven by spur-wheels 62, 63 gearing with a toothed ring on the valve 36, and the distributors 65, 66 are so arranged that each magneto supplies current to alternate cylinders, so that, in the event of the failure of one magneto, the cylinders which are working will be evenly distributed around the axis. The Provisional Specification states also that when the engine is stationary or employed for motor-vehicles, and rotates at a lower speed than for aircraft, the inlet scoops and exhaust outlets may each communicate with an annular chamber connected respectively with a fan and an air-pump, and the engine may be controlled by throttling the air-supply fan.

112,922. Internal-combustion Engines. Jouffret, H. V. J., 63, Boulevard des Batignolles, Paris. Aug. 2nd, 1917. No. 11142. Convention date, Jan. 26th. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act.

FIG 2



Cylinders and Valve-chests, Construction of and Cooling.—A water-jacket d is secured in position by the insertion of the cylinders b, which are screwed into the cylinder head a and have flanges b^2 engaging the bottom of the jacket. A part a^4 of the water-jacket may be formed in the cylinder head, and the flanges b^2 may be threaded on the cylinders for adjustment. The jacket d is preferably of aluminium, and the cylinders b of steel.

113,100. Aeronautics. Antoine, T., 16, Hammersmith Terrace, London.

Steering.—Aeroplanes having two or more supporting-planes adjustable about axes near their front edges, have the angle of incidence of the planes adjusted by diagonal tension members extending between the planes longitudinally of the machine and connected to pulleys mounted on rotary shafts carried by the planes. Figs. 3 and 4 show respectively a side view partly in section and an underneath plan of a biplane wing. The upper and lower planes are pivoted to front and rear struts c^1, e and are stayed by diagonal members g, g^1 of adjustable length. A pair of members g extends from the upper end of the rear spar to two pulleys i, i^1 on a shaft h supported by the front spar a^1 of the lower plane. The member g^1 passes around a pulley j carried by the lower plane and is attached to a pulley i^2 on the shaft h so that rotation of the shaft causes one diagonal to be shortened as the other is lengthened. The interplane struts are stayed transversely by the usual cross-bracing. The angle of incidence is changed by turning the shaft h through gearing

FIG 2

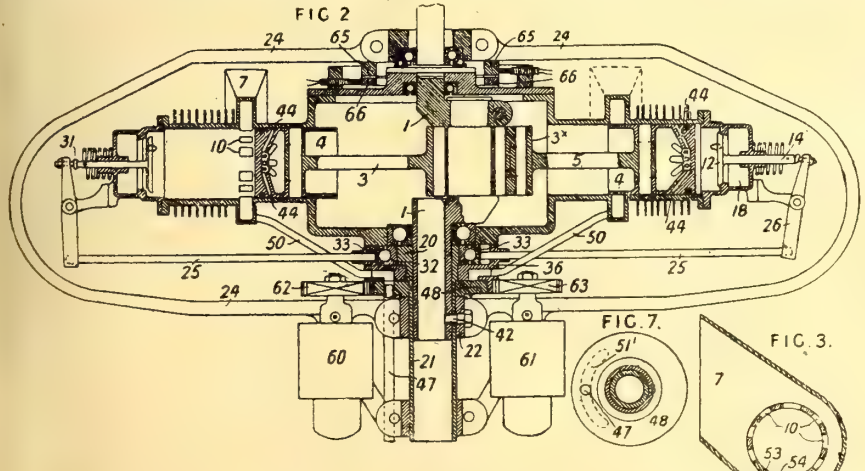
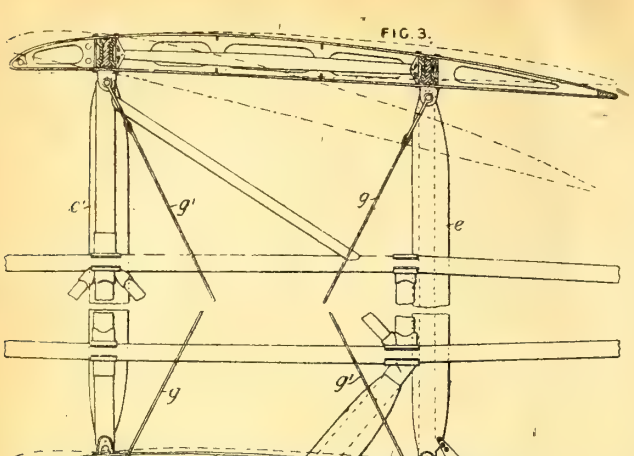
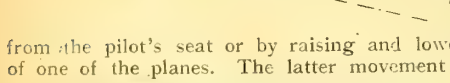


FIG. 7.

FIG. 3.

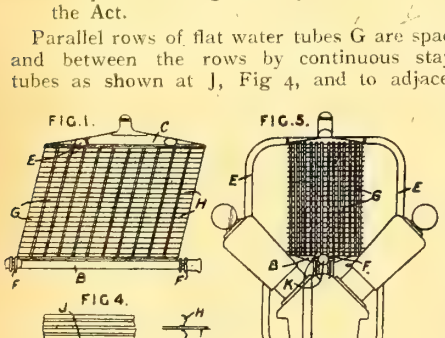


from the pilot's seat or by raising and lowering the rear spar of one of the planes. The latter movement may be effected by pivoted cams having peripheral flanges bearing against one or more rollers on the lower plane or on one of the struts *e*. In the case of multiplanes, the planes may be arranged one behind another at different levels and interconnected or one or more may be fixed and the remainder adjustable.



113,088. Radiators for Internal-combustion Engine. Soc. Lorraine des Anciens Etablissements de Dietrich & Cie de Luneville, 40, Rue du Colisée, Paris. Jan. 2nd, 1918. No. 118. Convention date, Jan. 27th, 1917. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act.

Parallel rows of flat water tubes G are spaced apart individually and between the rows by continuous stays H united to the tubes as shown at J, Fig 4, and to adjacent stays along their whole length by soldering, welding, or brazing. The assembled block is mounted between upper and lower collectors C, B, Fig. 1, the tubes extending into the collectors to give strength to the connection. The circulating-pump connects with a perforated tube K, Fig. 5, within the lower collector, and the upper collector is connected to the cylinder jacket by a tube E. The radiator may be mounted between the V-cylinders of an aeroplane engine as shown in Fig. 5, the pipe K in the lower collector being provided with attachment-lugs F, Fig. 1.



SALE OF FLAXSEED.

The following notice has been received from the Department of Agriculture and Technical Instruction for Ireland:—

The attention of flaxseed merchants is directed to their obligations under the Sale of Flaxseed (Ireland) Order, 1917, issued on December 14th, 1917, by the Ministry of Munitions. Under the provisions of this Order the price charged by a wholesale dealer to a retail dealer must not exceed the cost price to the wholesale dealer by more than 7/6 per bag of 182 lbs. together with actual charges for carriage and an allowance for such actual and necessary charges as may be approved by the Department.

The price charged by a retail dealer to a farmer should not exceed the actual cost price of such seed to the retail dealer by more than 10/- per bag of 182 lbs.

Retail dealers having sowing flaxseed for sale are required under the Order to display prominently on their premises a statement showing the price at which they are selling each lot of such seed.

Persons who contravene the Order are guilty of an offence under the Defence of the Realm Act.

NOTICE TO FLAXGROWERS.

The Department again warn farmers against the danger of sowing old flaxseed unless they have satisfied themselves that the termination is satisfactory.

Farmers would be only consulting their own interests in ascertaining the germination of their flaxseed before sowing it.

TIMBER: ITS IDENTIFICATION AND MECHANICAL PROPERTIES

On April 11th a meeting of the Aeronautical Society of Great Britain was held at the Royal Society of Arts Hall, when Mr. W. H. Barling, A.R.C.Sc., B.S.C., an associate fellow of the Aeronautical Society, read a paper entitled "Timber: Its Identification and Mechanical Properties."

Professor Percy Groom, D.Sc., Professor of Technology of Woods and Fibres at the Imperial College of Science, and Chief Timber Specialist at the Air Ministry, who is probably the greatest living authority on the subject, took the chair.

Mr. Barling gave an interesting discourse on timber from the point of view of an engineer rather than that of a botanist. He showed that the subject was one which demanded the closest study because, while the engineer was concerned with not more than a hundred metals, there were at least a 1,000 different kinds of wood in every-day use.

The engineer was handicapped in selecting and identifying timber because he handled it in the cut-up state, and had none of the botanist's aids, such as bark, leaves or buds from which to make conclusions.

The lecturer showed a large number of micro-slides which demonstrated the structure of the fibres of timber, and demonstrated how, with the aid of a low-powered microscope, the various timbers could be identified by their characteristic cellular structure, there being a providential arrangement which caused the almost endless varieties of timbers to differ from each other in one or other of the features in the structure of their trachieds, or annual rings, in their medullary rays and resin ducts.

Mr. Barling discussed the effects of the different soils in which timber of one species grew upon its density and other mechanical properties, and also the different qualities found in timber possessing various degrees of moisture.

He also discussed interesting phenomena found in the breaking stresses of timber put under load for short and long timber. For instance, 80 per cent. of the load which a beam would stand for a few minutes would be sufficient to break it if applied for a period, day and night.

The author thought that 50 per cent. of the load which a beam would stand if applied for the usual testing period (10 minutes) would cause it to collapse if applied for a sufficient time.

In concluding, Mr. Barling thanked the Superintendent of the Royal Aircraft Factory for his permission to use his lantern slides of timber sections, and paid a tribute to the work of Professor Groom, whose able lectures on the identification of timber formed an excellent foundation for later work.

It is interesting to note that Mr. Barling is associated in timber research with Mr. W. G. Tarrant, well known as the constructor of the Tarrant Huts, and as one whose ideas on timber structures for aircraft are both original and exceedingly practical.

The Discussion.

Professor Groom, in opening the discussion, laid emphasis upon the varying properties of timber, not only in the same species, but even in different parts of the same tree, and pointed out the consequent need for selecting timber for its quality as well as for its type.

He alluded to an interesting Indian timber which had a very strong elastic limit, which absolutely coincided with its breaking point, so that actually it was infinitely brittle.

He also pointed out that the properties of a timber could be varied according to the conditions, and particularly with relation to the rate of its growth.

He felt that investigation should be made into the powers of timber to resist shock.

Captain Benest read a letter from Colonel Linton Hope on the subject of the use of mahogany in yacht building, which showed that despite the enormous range of timbers to which this name was given, it had been found possible to procure a mahogany of uniform quality, for racing-boat building at any rate.

Mr. Griffiths, of the Royal Aircraft Factory, pointed out that timber stressed tortionally could be twisted to a greater extent without fracture over a longer period of time than was possible if the same degree of stress was applied during a shorter period.

Lieut.-Col. Ogilvie, R.A.F., who was asked to express his views, explained that he had really come to the lecture to learn. He felt that by the time we knew all that should be known concerning timber for aircraft it would no longer be employed.

Mr. Parnacott asked for study relating to glued joints. He thought that structures built up of plies of timber would be stronger than similar structures formed from a solid spar.

General Ruck thanked the Chairman for his attendance and said that the Air Ministry was to be congratulated upon having secured his services.

Firth's Best Cast Steel Files.

Apply for Copy of the New Official Price List.

Thos. Firth & Sons, L^d, Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.



Everything from a split pin to a complete unit....

You can put your finger on what you want

at Ascol House, Long Acre. Whatever you need, may be from a split pin to a complete unit—you can get it in our Showrooms at Ascol House—and you can be supplied without fuss, without delay, and with the certainty that whatever is supplied will bear the closest inspection.

We offer you a complete and comprehensive service in the provision of Aircraft Parts.

Take advantage of our organisation and stocks.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

ASCOL HOUSE, 125, Long Acre, LONDON, W.C.2.

Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

Managing Director:	*Works:*	*Telephone:*	*Telegrams:*
G. H. Mansfield.	*Little James St. London, W.C.1.*	*Gerrard 276. Private Branch Exchange.*	*"Upcast, Rand." London.*

A Journal for Aircraft Manufacturers.

Aircraft Supplies, our Fortnightly House Journal, published on alternate Thursday evenings, contains a complete list of Stock of Aircraft Parts up to the time of going to press, Current Prices, Details of New Items, Enquiry Bureau, Charts and Tables of Various Parts, and Short Articles of interest to Aircraft Manufacturers. Copies of "Aircraft Supplies" will be sent FREE to the Air Services and to the Aircraft Industry (those in charge of Stores and other Works and Service Departments only). Applications should be made on business or official paper and should state nature of contracts.

SBAC — The Society of British Aircraft Constructors

ASCOL

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

April 10th, 1918.

COPPER.—The demand for Copper both here and in U.S.A. continues to increase; it is, however, gratifying to learn that the output has considerably improved recently.

Although there have been one or two complaints of supplies not being satisfactory, the position generally does not give any cause for anxiety. In fact the outlook is quite good.

There is still a keen agitation in U.S.A., particularly among small producers, for an increase in price, and if no alteration is made immediately, it is practically certain that an advance will be given after July 1st.

TIN.—The position of this market is still unsatisfactory, although there has been a little improvement recently, due to large quantities of Tin having recently arrived.

The Metal Exchange Licensing Committee are exercising a very close control on available supplies, and it is not easy to obtain a permit unless it can be proved that the metal is actually required to fill a contract which has actually been placed.

The situation generally is easier than it was a fortnight ago, and the outlook is brighter. It is hoped that there will be a relaxation of restrictions shortly.

Prices in London are £10 lower than the prices ruling in the East, and large quantities of East Tin are being brought by U.S.A., the position there being very serious indeed. Prices here have been fairly steady recently, and it is not expected that there will be any violent fluctuations during the next few weeks.

COMPARATIVE PRICES.

To-day, 8th	£318 0 0
April 4th	£316 0 0
Last month	£319 0 0
Last year	£216 0 0

LEAD.—There has not been any alteration in prices, and supplies are fairly satisfactory.

STEEL.—While the demand for Aircraft Steels continues to increase, the mills appear to be meeting the demands made upon them satisfactorily, and there does not appear to be much difficulty in obtaining supplies.

It is also expected that there will be ample supplies of High Speed and Cast Steel available in a few weeks, firms in U.S.A having signified their willingness to make all the Tool Steel they will require. It is therefore expected that exports to U.S.A. will be prohibited. There should, therefore, be a corresponding increase in the supplies available for home consumption.

The discontinuance of shipments of High Speed, Carbon, and ordinary Steels to Russia will also have a similar effect on supplies. In fact, in some quarters a slump is expected. It is well known that there is about 1,000 tons of High Speed and Carbon Steels lying in various British ports, which was originally consigned to Russia.

Prices continue unchanged.

TIMBER.—The question of Timber supplies is causing grave anxiety; the huge demand can hardly be satisfied with the small shipments which have recently been received. In fact, it is reported that some factories have been in considerable difficulties recently owing to shortage of Silver Spruce. The situation demands an official enquiry.

It is now evident that although the Air Board knew that there were three or four substitutes which were quite as good as, if not better than, the substitute officially approved, they put all their eggs in one basket and banked on the latter. The material does not appear to be giving anything like satisfactory results, and recent reports indicate that the situation is worse now than it ever has been. The outlook is very black indeed with very little hope of improvement.

The Plywood situation continues to improve.

Mahogany and Walnut supplies are fairly satisfactory.

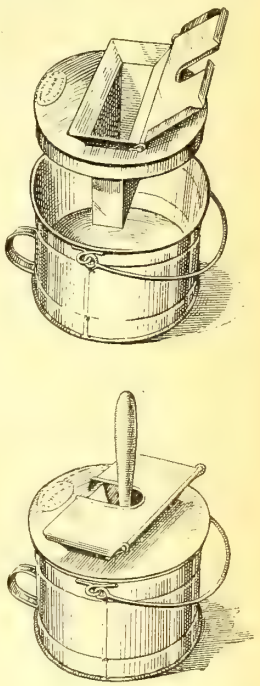
Prices are very firm.

FABRIC.—Supplies are quite satisfactory at present. It is understood that the authorities are arranging for a coarser Linen Fabric to be supplied with the object of conserving the stock of yarns. There does not appear to be any reason why this should not have been done over 12 months ago.

The policy of Government Departments appears to be "wait for a crisis then devise means of getting over it." At least this is what has happened in the case of Fabric, Timber, Dope, etc.

A PRACTICAL DOPE CAN.

Considerable difficulty has been experienced in the practical use of aeroplane dope, owing to the volatile nature of the chemicals from which it is formed, and a good deal of wastage results through evaporation from the pots which the operatives use when applying it. It is also affected by the dust which it readily collects



Various ingenious devices have been produced to handle dope in an economical fashion, and at the same time to render its application easy and unobstructed, and a very successful effort has been made by Arthur Hill & Co., Sheet Metal Works, Silchester Road, W.10, who have evolved the dope can illustrated. It will be seen that it consists of a simple pot fitted with a lid which slides on easily without any mechanical fastening.

From the centre of the lid a well descends and almost touches the bottom of the pot when in place. Thus all the dope in the pot is excluded from the air, except the surface of the small portion trapped by the well, and evaporation even at this opening is reduced to a minimum during temporary stoppage of work by the fitting of a fall-down lid

The apparatus is patented, and the proprietors will be pleased to quote for large and small quantities.

MACHINE SHOP ACCESSORIES.

James W. Carr & Co., Ltd., of 35, Queen Victoria Street, E.C.4., who specialise in the supply of machine tools and other hardware, have issued an interesting brochure concerning machine shop accessories and invite those interested to apply for a copy.

A DISCLAIMER.

Mr. F. A. Dolman, of 2, Stag Lane, Edgware, wishes it to be known that he is not in any way connected with the Camden Construction Company.

AN AUTOMATIC AIRSCREW-SHAPING MACHINE.

A very interesting airscrew-shaping machine has recently been introduced by the well-known firm of J. Sagar and Co., Ltd., of Halifax. This has been specially designed for shaping airscrews with two or four blades.

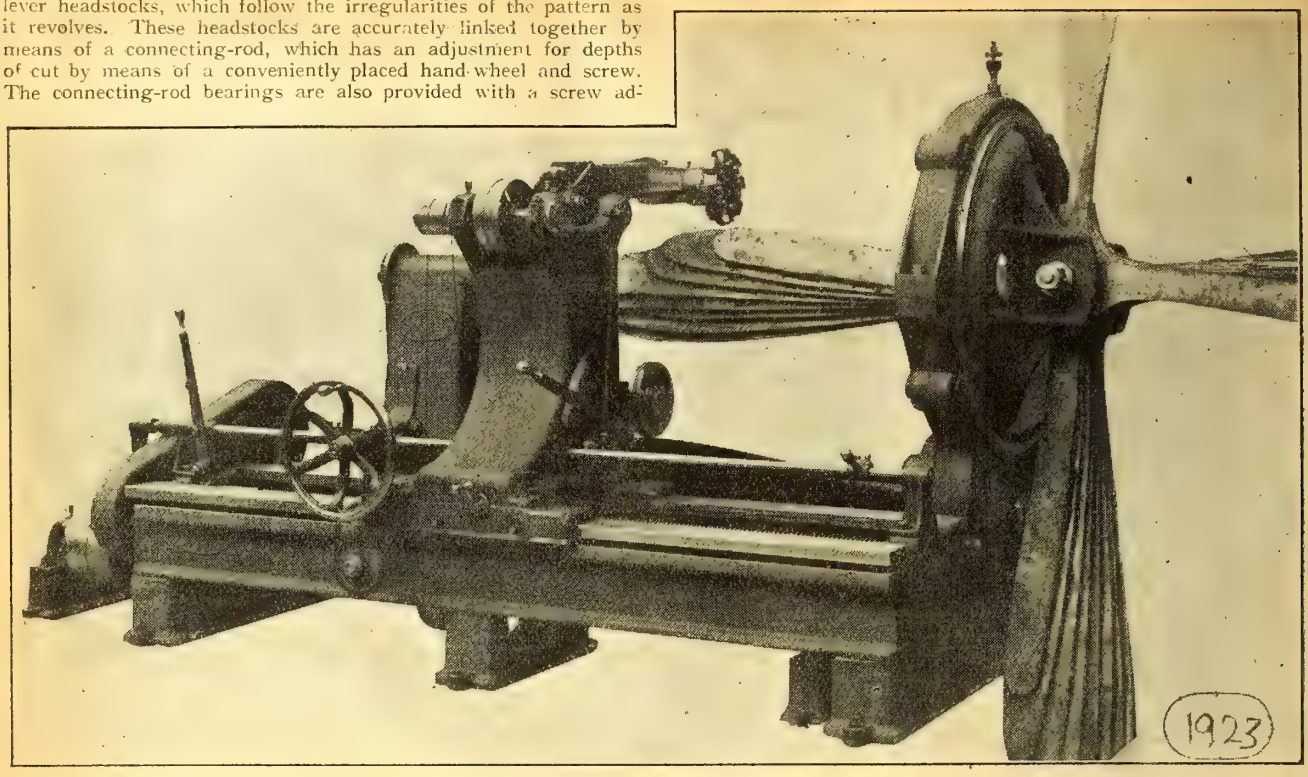
The main frame of the machine consists of a heavy bed mounted on suitable standards, and carrying the traversing cutterhead and former carriage, and the double headstocks which hold the screw to be shaped, and the metal pattern or template.

The revolving disc headstock which carries the airscrew to be shaped is driven by machine-cut gearing, and its revolutions are correctly synchronised with the spindle carrying the tip of the blade, and also with the spindles carrying the metal pattern or template, the necessary accuracy being obtained by means of machine-cut gearing, and silent chain-driving between the various spindles. The airscrew is firmly held by means of a suitable cramping device fitted to the revolving disc headstock.

The loose headstock spindle is provided with self-centring cramping jaws to hold firmly the top of the airscrew blade whilst being shaped, which effectively eliminates any possibility of end-thrust or buckling action. This is an important feature, and has a great deal to do with the smooth finish and necessary accuracy which is required in shaping the blades, especially the more slender portions.

The cutterhead and former spindles are mounted in rocking

lever headstocks, which follow the irregularities of the pattern as it revolves. These headstocks are accurately linked together by means of a connecting-rod, which has an adjustment for depths of cut by means of a conveniently placed hand-wheel and screw. The connecting-rod bearings are also provided with a screw adjustment for taking up wear or end-play, so that any vibration can be eliminated between the cutter head and the former.



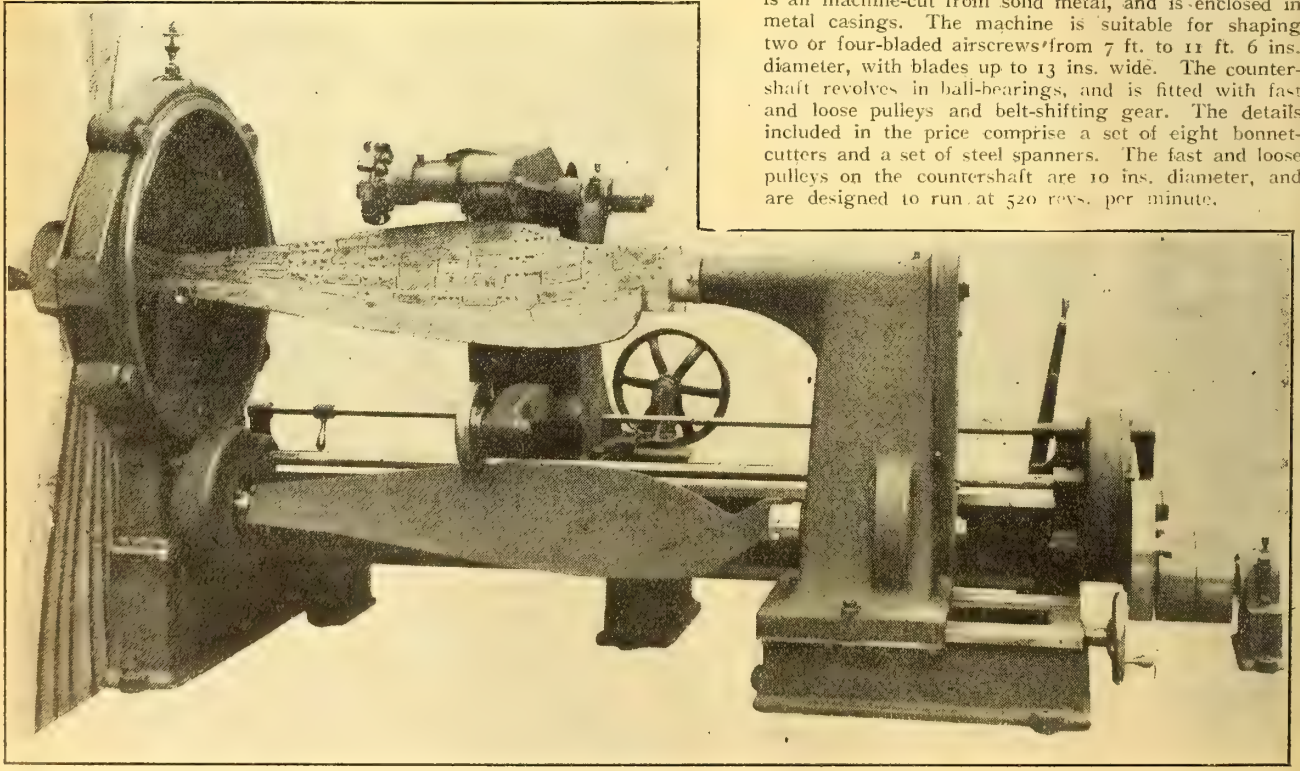
Blade-front View of the Sagar Airscrew Shaper.

This particular adjustment is specially mentioned, as it is altogether different from that generally used on an ordinary copying machine. Each spindle is made of high carbon steel, and revolves in roller or ball bearings. Screw adjustments are provided for regulating different depths of cut and a convenient hand-lever arrangement is fitted, instantly putting in or out of action the cutterhead and former.

The cutterhead is fitted with eight bonnet-cutters formed from solid steel, and carefully shaped and ground so as to fit accurately the seatings in the cutterhead.

The traversing headstock carrying the cutterhead and former spindles travels automatically along the bed by means of a screw, and can be stopped in any position by moving a conveniently placed hand-lever, or by releasing the grip nut in which the traversing screw works. A hand-wheel motion actuating a pinion and rack fixed to the bed is provided so that the traversing headstock can be moved quickly along the bed when it is returned to the starting position after the shaping of the blade is completed. Each blade is shaped by one traverse of the headstock, suitable stops being provided for arresting automatically the traverse at the end of each operation.

The feeding mechanism is arranged to give a feed of $\frac{1}{2}$-in. per rev. of the work, or 3 in. and 6 in. per minute of travel along the bed, so that the blade of a medium-sized airscrew can be completely shaped in 10 to 15 minutes. The gearing is all machine-cut from solid metal, and is enclosed in metal casings. The machine is suitable for shaping two or four-bladed airscrews from 7 ft. to 11 ft. 6 ins. diameter, with blades up to 13 ins. wide. The countershaft revolves in ball-bearings, and is fitted with fast and loose pulleys and belt-shifting gear. The details included in the price comprise a set of eight bonnet-cutters and a set of steel spanners. The fast and loose pulleys on the countershaft are 10 ins. diameter, and are designed to run at 520 revs. per minute.



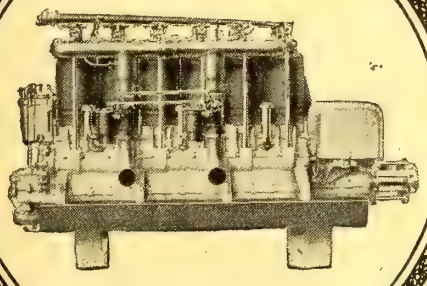
Blade-back View of the Sagar Airscrew Shaper.



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

BEARDMORE AERO ENGINE



The Name which guarantees EFFICIENCY and advanced design.

The BEARDMORE AERO ENGINE Ltd.
London Showrooms and Depots:
112, Gt. Portland Street, London, W.1.
Telephone: Gerrard 238.

C.D.C.

Allen's Steels



For Motor Cars - -
For Aeroplanes - -

Write for this Book.

IN Aircraft and Aeroplane-part manufacture the precise **character** of the Steel used makes all the difference. Endless trouble and loss are avoided by using for each part the one Steel which has **all** the qualities required for that part, and has been worked-out with knowledge of the practical engineering requirements.

Allen's Catalogue D (3rd Edition) contains valuable information on Steels for Aircraft and Motors.

WRITE FOR IT NOW.

Edgar Allen & Co. Ltd.
Imperial Steel Works, Sheffield.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE,

"CLERGET" PATENT AERO ENGINES.



ENGINEERS, LONDON.

"GWYNNE, LONDON."

AIRCRAFT FINANCE

CURRENT TOPICS.

A SCANDINAVIAN AERIAL TRANSPORT CO.

Transport through the air is bound to become the recognised method of general, rapid travelling, and one does not need to be a prophet to forecast the formation, sooner or later, of companies in every part of the world to exploit aerial conveyances.

It will certainly occupy the attention of all the astutest financiers—British, French, American, and Italian—immediately we are once again permitted to forget the war. In the meantime the pace is started by a neutral country.

The Norwegian Air Route Company.

This Company, which has a capital already subscribed of 3,000,000 krona in shares of 1,000 krona each, representing in normal exchange a capitalisation of about £165,000 in shares of about £55 each, has been formed to inaugurate and carry on a regular mail and passenger service between Aberdeen and Stavanger. Arrangements are contemplated for extending the service from Stavanger to Christiania via Christianssand, and also by similar route to Copenhagen and Bergen.

The Time Table.

Already a time table giving days and hours of departure and arrival has been prepared and one may expect very shortly to see the addition of a section, devoted to aerial transport, in our Bradshaw and A.B.C. books of reference. It is stated that the passage across the North Sea will be covered in less than five hours, and it is said that a regular service will begin next month between Skaw and Copenhagen

British Sympathy.

The Director of the Seaplane Department of the Royal Norwegian Navy (Captain Dehli) has accepted the position of Technical Adviser to the new company, and is at present in London negotiating with our Government for sympathetic reception of the project. Naturally, in the present moment, all kinds of safeguards to our national security will require to be imposed, but the scheme is a step in the right direction, and as such merits our most benevolent consideration and reciprocity.

AIRCRAFT.

Aviation is fast becoming the favourite pivot on which to rotate all kinds of ingenious attempts to gain some pecuniary advantage. Out of the gullible public, by the many anxious to secure a foothold in the industry, and out of the State by some already established. It is "Air Craft" writ in two syllables with the latter strongly accentuated.

Revelations.

The subject ranges from the tricks and subterfuges to evade the excess profits duties and taxes to the persiflage connected with covert invitations to subscribe for shares in companies unable to secure Treasury consent for an issue. Perhaps the most up-to-date method is the "report" (*sic*) of the directors who conveniently "camouflage" the position by the statement that they "regret being unable to publish any accounts in consequence of the outstanding questions relating to excess profits duty and taxation." The multiplicity of detail and the mass of information under this head prevent it being dealt with adequately in one article. It will therefore appear in these columns, under this heading, from time to time, as space permits.

A Glaring Anomaly.

How the Registration Officials are openly hoodwinked and the whole of the laborious enactments of the Companies Acts set at defiance is of sufficient importance to form the first subject for presentation.

A company was formed with the nominal capital of £10,000, divided into shares of £1 each, and the registration fees of 5s. per One hundred pounds (£25) duly paid. Thereupon a meeting was duly convened and the shares were at once split up into 200,000 shares of 1s. each and concurrently the Directors, by simple resolution, Resolved that no shares be issued at less than 10s. per share. All perfectly legal and in conformity with the Acts passed and approved by the Solicitors of the company.

If one will examine the effect it will be seen that the capital of the company by this method really consists of 200,000 shares of 10s. each, equal £100,000 upon which should have been paid fees amounting to £250.

In this way the Treasury is defrauded openly of no less than £225, notwithstanding all the elaborate machinery of the Consolidated Companies Acts. This is not an imaginative case, as the company actually exists, and the directors, one of whom is a peer, are vastly proud of the fact that they have "saved" their company such a large amount of unnecessary expense.

Immediate Treasury Action Wanted.

The name of the company and other particulars are at the disposal of the company officials and the Treasury. Steps must be taken at once to put a stop to so glaring a breach in the construction of the Act, not only to prevent a repetition, but for the more important reason that it is an open doorway for the perpetration of fraud upon shareholders.—G. A.

THE BRITISH IGNITION APPARATUS ASSOCIATION.

At a recent meeting of the Edinburgh Rotary Club an address was given on the remarkable development of the British Magneto Industry by Mr. Peter F. Bennett (of Thomson-Bennett Magnetos Ltd., Birmingham), chairman of the British Ignition Apparatus Association. He explained that at the outbreak of war Britain was dependent on Germany and America for practically all the raw material used in the magneto. Now, however, the manufacturers were producing better magnetos than the Germans.

He said that Government departments had become alive to the situation and by co-operation the manufacturers had been able to make enormous developments which he hoped would enable them to compete successfully with all rivals after the war. The capital invested in the British Magneto Industry was approximately one million pounds, and it gave employment to 5,000 people—not including those engaged in subsidiary trades.

When the day of reconstruction came British magnetos would not be found wanting. At any rate, the theory of Bosch infallibility had been absolutely exploded. A cordial vote of thanks was recorded to Mr. Bennett on the motion of Mr. J. Albert Thomson.

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES

The files of the following new companies are available for inspection at Somerset House.

Aeronautical Engineering Co., Limited.—Private Company. Registered March 27th. Capital £20,000 in £1 shares. Electrical, general and mechanical engineers, cabinet makers and furniture manufacturers; manufacturers, repairers and letters on hire of and dealers in aeroplanes, aeroplane engines, parts and accessories, etc. The subscribers (each with one share) are: F. H. H. Samuel, 31/34, Basinghall Street, E.C.2., solicitor; Theo. McKenna, 31/34, Basinghall Street, E.C.2, solicitor. The first directors are to be appointed by the subscribers. Solicitors: McKenna & Co., 31/34, Basinghall Street, E.C.2.

Alwin Engineering Co., Ltd.—Private Company. Registered March 25th. Capital £1,000 in £1 shares. To take over the business of an aviation and general engineer, etc., carried on at 8, Luther Road, Teddington, as the Alwin Engineering Co. The subscribers (each with one share are):—A. E. Cartlidge, 8, Luther Road, Teddington, engineer; Mrs. E. F. Cartlidge, 8, Luther Road, Teddington. The first directors are: A. E. Cartlidge and E. Griffin. Qualification, £100. Registered office: 8, Luther Road, Teddington.

Brentford Aircraft, Ltd.—Registered April 2nd, 1918. Capital, £10,000 in £1 shares. Registered office: Market Place, Brentford, Middlesex.

Co-operative Gauge and Precision Toolmakers Association.—Registered Jan. 18th, 1918. Gauges for aircraft and submarine work, tools, small parts for naval guns, etc. 56, Myddleton Street, E.C.1. Partners (1) Hubert Elkerbout (Dutch), 23, Myddleton Square, E.C.1; (2) T. Broeder (Dutch), 27, St. Martin's Avenue, East Ham, E.6.

North Finchley Motors and Metals, Ltd.—Registered March 26th, 1918. Capital, £5,000 in £1 shares. Registered office: 15, Woodbourne Parade, North Finchley, N.12.

Thames Engineering and Aircraft Co., Ltd.—Registered April 10th. Capital, £20,000 in 10,000 10 per cent non-cumulative preference shares of £1 each and 40,000 deferred shares of 5s. each. To carry on the business of manufacturers, constructors and designers of, contractors for, and dealers in

aeroplanes, airships, aircraft of all kinds, automobiles, motor-cars, cycles, vehicles, boats and vessels, dynamos, engines, and parts, etc. The subscribers (each with one share) are:—F. C. March, 34, Victoria Street, S.W. (consulting engineer); H. March, 34, Victoria Street, S.W. (civil engineer); I. Smith, Colonial Buildings, Halifax (wool merchant); E. de Marney, 34, Victoria Street, S.W. (company secretary); M. K. Parsons, 265, Bath Road, Hounslow (clerk); N. W. Perrott, 66, Victoria Street, S.W. (engineer); J. J. Morgan, 34, Victoria Street, S.W. (engineer). Minimum cash subscription: 3 preference shares. The first directors are:—F. C. March, J. C. Staton and C. H. St. J. Cooper. Registered office: Point Pleasant Wharf, Wandsworth, S.W.

MORTGAGES AND CHARGES.

Handley Page, Ltd.—Debenture dated Feb. 4th, 1918, to secure £100,000 charged on the Company's undertaking and property, present and future, including uncalled capital. Holders: London, Provincial and South Western Bank.

Cowper-Coles Aircraft Co., Ltd.—Debenture dated Jan. 28th, 1918, to secure £10,000 charged on the Company's undertaking and property, present and future, including uncalled capital. Holders: London, Provincial and South Western Bank, Fenchurch Street, E.C.

Aircraft Manufacturing Co., Ltd.—Mortgage registered March 28th, 1918, for £4,000.

Norman Thompson Flight Co., Ltd.—Particulars of £15,000 debentures created April 4th, 1918, filed pursuant to Section 93 (3) of the Companies (Consolidation) Act, 1908, the whole amount being now issued. Property charged: The Company's undertaking and property, present and future, including uncalled capital, subject to prior debentures. No trustees

SATISFACTION.

Grahame-White Aviation Co., Ltd.—Satisfaction filed March 27th, 1918, of £80,000 registered December 19th, 1917.

DIVIDEND DECLARATIONS.

A. Darracq & Co., Ltd. (1905).—An interim dividend of 5 per cent. (less income tax) has been declared on the ordinary shares, payable April 30th, 1918.

Charron, Ltd.—An interim dividend at the rate of 7 per cent. per annum (less income tax) has been declared on the preference shares in respect of the three months ended March 31st.

Armstrong, Whitworth & Co., Ltd.—The Directors announce that in view of the impossibility of completing the 1917 accounts for some time in consequence of existing circumstances they have decided to pay a dividend of 1s. 6d. per share, free of income tax, on the ordinary shares of the company, 4 per cent. per annum on the first preference shares, and 5 per cent. on the second preference shares (both less income tax).

Electrical Utilities Corporation (New York).—A quarterly dividend (No. 32) of 1¼ per cent. on the prepared stock has been declared payable April 15th for the quarter ending March 31st, 1918.

Vickers, Ltd.—A final dividend for 1917 of 1s. 6d. per share on the ordinary shares has been declared. This makes, with the dividend already paid, 12½ per cent. (tax free) for the year being the same as for 1916. The present dividend declared is payable May 10th.

Vauxhall Motors.—The Directors' report for 1917 has just been issued. It is proposed to pay a final dividend of 1s. 3d. per share (less tax) making 10 per cent. for the year. The Directors state that they regret their inability to submit the accounts owing to the delays in settling the amount of excess profits duty and special taxation payable by the company. The shareholders' meeting is convened to be held at Winchester House on the 19th inst.

THE TRUTH AND NOTHING BUT THE TRUTH.

The following, which appeared in "John Bull" on April 13th, is an excellent example of the typical Englishman's dislike for hearing or reading the truth about himself:—

To Charles G. Grey, Esq., Editor "The Aeroplane."

Dear Sir,—Some of the splendid fellows of the R.A.F., whom you so vulgarly traduce in your columns, are furious with you. And I am not surprised. "We have," you say, "a great deal too much limelight on our aviation," and you do your best to belittle their wonderful services. "If one has to go and make war one can imagine no more delightful way of doing it that by going out to be killed for a few hours a day, and spending the rest of the time in comfortable huts, replete with all the comforts of home, from tablecloths to Kirchner pictures." Do you know the average life of an airman at the Front? Why don't *you* go and make war in this "delightful way"; and spare us your pretty wit? There's still room for men of your age! John Bull.

[To paraphrase a popular quotation. "Abuse from Mr. Bottomley is praise indeed." Some people have no sense of proportion, and others no sense of any kind.

This paragraph is inserted on the "Finance" page because it is the only portion of the paper which Mr. Bottomley is likely to understand.—Ed.]

AEROPLANE GENERAL SUNDRIES, LTD.

The following letter has reference to the recent litigation between the A.G.S. Manufacturing Co., Ltd., and Aeroplane General Sundries, Ltd.:—

Sir,—I presume you will be publishing in your next issue a report of the recent appeal brought by this Company in the Court of Appeal in the case of the A.G.S. Manufacturing Co., Ltd., v. the Aeroplane General Sundries, Ltd. An injunction was granted against the latter Company to restrain it "from representing by advertisement or otherwise that the letters A.G.S. stand for or are another name for 'Aeroplane General Sundries, Limited.'"

It was suggested that I had intended to confuse it with the A.G.S. Manufacturing Co., Ltd. It will not be necessary for me to assure the many friends I have in the Aircraft Industry that nothing has been further from my intention. The trouble arose in the first instance through a statement made in one of my earlier advertisements. This statement was made in perfectly good faith. Immediately the point was raised the advertisement was discontinued, and I have always done my best to give prominence to the full name and address of my Company, and I fail to see how any possible misunderstanding could arise.

The Appeal Court has now seen fit to confirm the decision of Mr. Justice Neville, and I should therefore be very grateful if you would allow me to emphasise through the medium of your journal that Aeroplane General Sundries, Ltd., is a Company founded by me, to manufacture and deal in A.G.S. parts, and has no connection with any other firm or company.

In a serious national crisis like the present, every woman is bound to do her utmost to serve her country, and it is my sole ambition to be of real service to the aircraft industry in which I have always taken a real interest. I hope that in spite of this unfavourable, legal decision or even because of it, I may rely on the continued and increased support of all who are assisting in the production of the aeroplanes on which the safety of our country depends.

Thanking you, in anticipation of your courtesy,

(Signed) For Aeroplane General Sundries, Ltd.

D. M. Nicholson (Managing Director).

[Thus it is made clear that Aeroplane General Sundries, Ltd., has a right to use its name in full, but not its initials alone.—Ed.]

CURRENT SHARE QUOTATIONS.

April 16th, 1918.

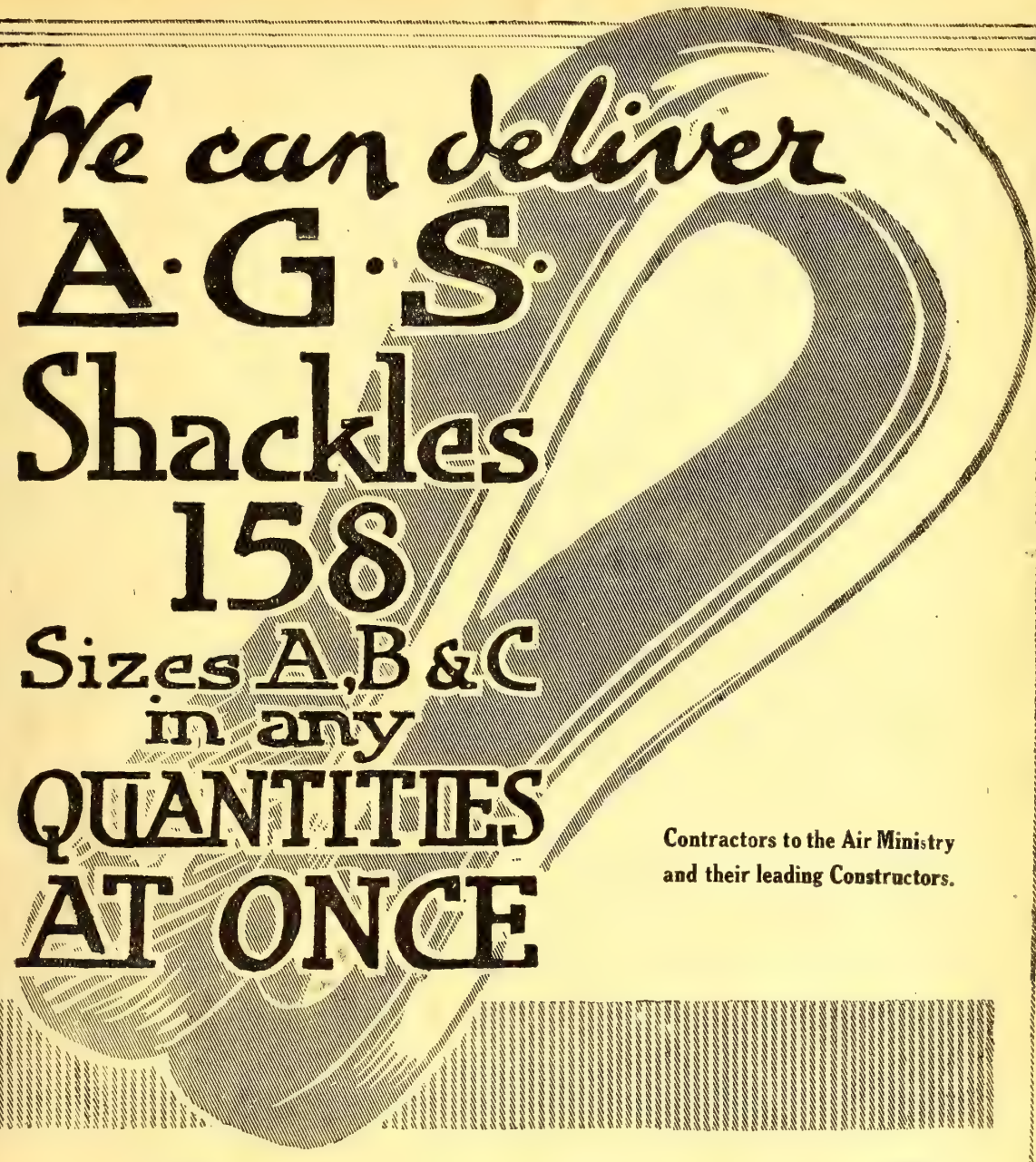
Aircraft Mnfg. Co.	7% cum. pref. £1 ...	22/-	23/-
	7% cum. & ptg. "B" pref., (fully paid) ...	21/-	22/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3⅛	3⅜
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	42/-	43/-
Austin Motor Co., Ltd.	7% cum. pref. £1...	18 6	19/6
	£1 ordinary	26/-	27/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	61/-	62/- x
	5% cum. "A" pref.	4⅛	4⅜
	6% cum. "B" pref.	20/-	21/-
Boulton & Paul, Ltd., 5% cum pref. £1		⅞	1
Brown Bros., Ltd., 6% cum. pref. £5...		4½	4¾
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	33/-	34/-
	7% cum. pref. £1...	22/-	23/- x
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	20/-	21/-
	£1 ordinary	25/-	26/-
Fellows Magneto Co., 8% cum. partip. pref.		16/-	17/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10⅛	10¾
	£10 ordinary	19¾	20
Gwynnes, Ltd., 5% cum. pref.		5⅝	⅝
Ordinary		38/-	39/-
Greenwood & Batley, Ltd., £10 ordinary		13½	14
Humber, Ltd., 6% cum. pref. £1		15/-	15 6
£1 ordinary		20/-	21/-
Napier (D) & Son, Ltd., 7½% cum. pf. £1		19/	20/-
£1 ordinary		31/-	32/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		19/-	20/-
Rolls Royce, Ltd.. £1 ordinary		33/-	34 xA
Rudge Whitworth, Ltd. £1 ordinary ...		45/	46/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	29/-	30/-
	5% cum. pref. £1 ...	16/	17/-
Sunbeam Motor Car Co., Ltd., £1 ord .		75/-	76/- x
Straker Squire, Ltd. (1913), £1 ordinary		22/-	23/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		28/-	29/-
Triplex Safety Glass, £1 ordinary... ...		27/-	28/-
Vickers, Ltd., 5% pref. stock...		78	82
5% pref. shares. £1 ...		17/6	18/-
£1 ordinary		42/-	43/-
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		17/-	18/-

GENERAL INFORMATION.

Armstrong, Whitworth (1916).
Austin Motor (1916).
B'ham. Small Arms (1915-16).
Rolls Royce.
Rudge Whitworth.
Straker-Squire (1916).
Sunbeam Motor.
Thorneycroft (J. I.) & Co.
Vickers (1915 and 1916).

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

x—ex dividend
xA—ex bonus shares



We can deliver
A·G·S·
Shackles
158
Sizes A, B & C
in any
QUANTITIES
AT ONCE

Contractors to the Air Ministry
and their leading Constructors.

The Actual Manufacterers
The British Gold Shell
Ring Co., Ltd.,
Hounslow, Middlesex

Telegraphic Address
"GOLSHEL, HOUNSLOW"

Telephone Address
HOUNSLOW 254.

"ULSTER" FANS

FOR ALL PURPOSES.

Forced and Induced Draft on Boilers. Fume s Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

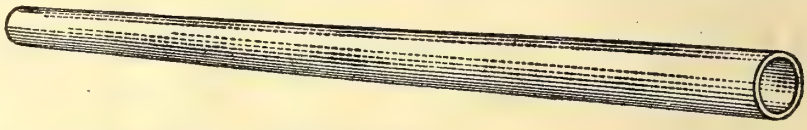
HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. **Hot-Water. Steam. "Ulster" Stoves.**

We Guarantee Success. Our 50 years' experience is at your disposal.

MUSGRAVE & CO., Ltd.,

Manufacturing Engineers,

BELFAST, LONDON, MANCHESTER, CARDIFF.





Patent No. 4704/15.

McGRUER SPARS are THE ACME of STRENGTH and LIGHTNESS

Particulars from :—

McGRUER BENTWOOD HOLLOW SPAR Co.,

Commercial Wharf, Lambeth, LONDON, S.E.1.

Heating & Ventilation for Aeroplane Factories Munition Shops Dope Rooms etc.

ROSSER & RUSSELL Ltd

ENGINEERS HEATING,

Manchester House, 37. Duke St, Oxford St, W1.

Telephone Mayfair 5210. Telegrams "Lesorus Hammer London"

Work in hand at the present time for

Messrs. Handley Page Ltd

National Aero Engine Co

Gnome & Le Rhone Engine Co

and many others

May we quote you for your requirements

(*Continued from page* 1418B).

Later in the day, when there was a slight improvement in the weather, our machines reconnoitred the new battle front between La Bassée and Armentières, and bombed and engaged with machine-gun fire the enemy's attacking troops.

Hostile low-flying machines were also active on this sector. Four of these machines were brought down by our aeroplanes, and one was shot down by our infantry.

Two of our aeroplanes are missing.

April 11th, 8.30 p.m.—The weather on the 10th inst. was most unfavourable for flying, but as soon as it was possible to leave the ground our aeroplanes went out to reconnoitre the battle front. Useful information was brought back as to the position of the enemy's troops, which were attacked with bombs and machine-gun fire on every suitable occasion.

Owing to the mist our pilots were compelled to fly at an average height of 200 ft. in order to obtain any information, and experienced very heavy fire from the ground.

The enemy's low-flying machines were also active on this front. Three hostile machines were shot down in our lines by our infantry, and four others brought down by our aeroplanes. One German machine was driven down out of control.

Seven of our machines are missing.

At midday on the 11th inst. a raid was carried out by us against Luxemburg railway station. Over a ton of bombs were dropped, and several bursts were seen on the railway and around the station. The enemy's anti-aircraft gunfire was considerable.

All our machines returned.

April 12th, 7.59 p.m.—The mist which has prevailed during the last few days continued till late in the afternoon of the 11th inst., when the weather gradually began to clear. While the mist lasted aerial activity was confined to the battle front north of La Bassée Canal, where our aeroplanes reconnoitred the line at a very low height and dropped bombs and fired their machine-guns at the enemy troops in the open.

When the mist cleared there was great activity in the air along the whole front. Several long-distance reconnaissances were carried out; many photographs were taken, and much fighting took place.

Twenty-one hostile machines were brought down, and 14 others were driven down out of control.

Four of our machines are missing. Two of our aeroplanes reported yesterday as missing have since returned.

During the night over eight tons of bombs were dropped on Bapaume, on villages south of the Somme, and on military objectives at Ostend and Zeebrugge.

One of our machines has not returned.

On the 12th inst. the Sablon railway station at Metz was successfully bombed. Twenty-two heavy bombs were dropped, all of which burst on the railway and the sidings.

All our machines returned.

April 13th, 8.50 p.m.—On the 12th inst. atmospheric conditions were favourable for flying, and a great concentration of our aeroplanes was effected by us on the battle-front

Large numbers of low-flying machines were employed in bombing and sweeping with machine-gun fire roads packed with the enemy's troops. Thirty-six tons of bombs were dropped and over 110,000 rounds of ammunition were fired by us

While these attacks on ground targets were in progress, other formations, flying at a greater height, engaged the enemy's aeroplanes, which were extremely active in this sector. Other machines reconnoitred the battle area, bringing back information as to the positions of our own and the enemy's troops.

On the remainder of the British front the usual work in co-operation with our artillery was carried out, and a very large number of photographs were taken.

In air fighting 40 German machines were brought down by our aeroplanes, and 20 other hostile aeroplanes were driven down out of control. In addition, two of the enemy's machines were shot down by anti-aircraft gun-fire. Three hostile observation balloons were also destroyed.

Twelve of our aeroplanes are missing.

After dark, the incessant bombing carried out by us during the previous 12 hours was continued until dawn. Over 22 tons of bombs were dropped on different targets, including the Don and Douai railway stations, two important railway junctions between Mézières and Reims, and roads leading up to the battle-front in the neighbourhood of Estaires.

April 14th, 8 p.m.—On the 13th inst. clouds and mist prevented fighting except at a low height from the ground. Our low-flying machines reconnoitred the battle-front throughout the day, and dropped over 1,200 bombs on the enemy's troops on roads leading to the front.

Only a few fights took place, and results were indecisive.

One of our machines is missing.

April 15th, 8 p.m.—On the 14th inst. our aeroplanes reconnoitred the enemy's lines on the Lys battle front, and were again obliged by clouds and mist to carry out their work at a very low height. Bombs were dropped and machine-gun fire was opened from the air on the enemy's troops in this area.

All our machines returned.

War Office Communiqués.

The G.O.C. Macedonia reports:—

April 13th.—On April 4th the Royal Flying Corps bombed Angista (Dedeagatch Railway) station and caused considerable damage to the railway lines. On their return our machines brought down a hostile aeroplane in the neighbourhood of Orfano.

On April 6th our aeroplanes co-operated against the enemy's gun emplacements and infantry.

On the evening of April 11th our aeroplanes bombed Porna station (Dedeagatch Railway). All the bombs dropped were observed to burst in or near the station buildings.

The G.O.C. Italy reports:—

April 14th.—The weather has been consistently bad, and little flying has been possible. On the few occasions the R.A.F. has been able to go out, three enemy machines have been destroyed, and two driven down out of control without loss to ourselves.

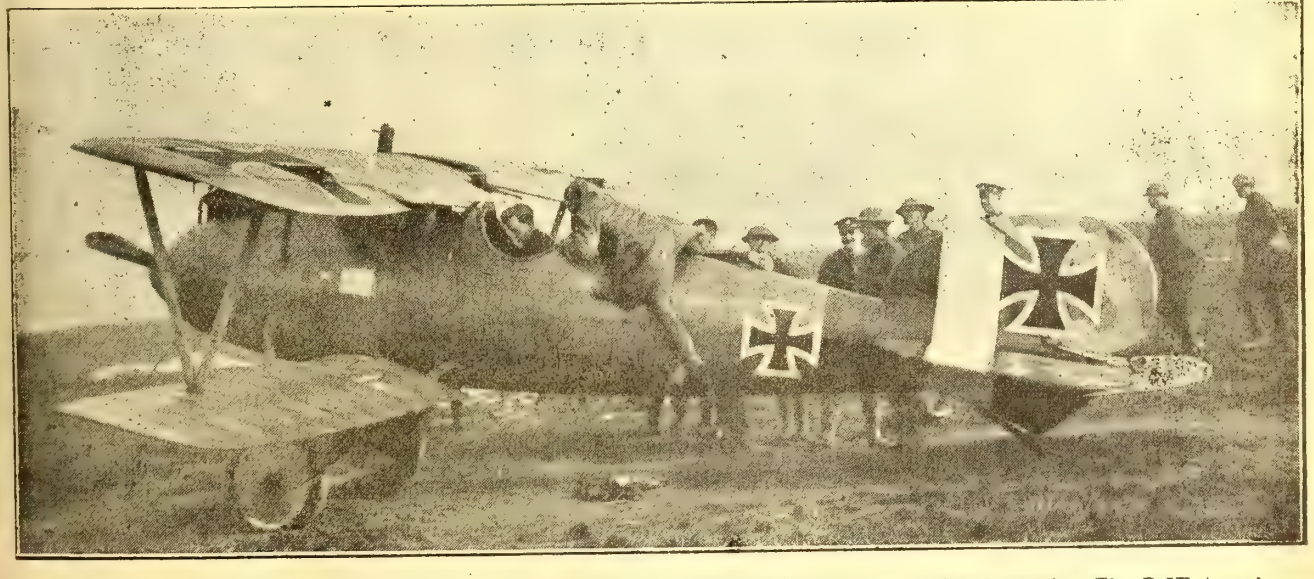
Home Command Communiqués.

April 12th, 11.50 p.m.—Some hostile airships crossed our East coast this evening, and proceeded to attack certain Eastern and Midland districts.

One or two of the raiders succeeded in penetrating farther inland, where some bombs are reported to have fallen. Further details are not yet available.

The raid is still in progress.

April 13th, 12.15 p.m.—Four airships participated in last night's raid. Two of them penetrated a few miles inland. Of the other two, one reached the Midlands, and the other nearly



A D.IV TYPE ALBATROS.—A British flying officer inspecting the internal economy of a captured sample. The D.IV type is fitted with a 260-h.p. Mercédès engine, as against the 160-h.p. of the D.III type.

reached the North-West Coast The raiders were travelling at a great height, and showed no inclination to attempt to penetrate defended areas. Most of the bombs were dropped in the open country, and apart from the demolition of four houses at one place the damage so far reported is inconsiderable.

A later communiqué announced that the casualties were as follows :—

Killed.—2 men, 2 women, 1 child; total 5.
Injured.—8 men, 6 women, 1 child; total, 15

THE CASUALTY LIST.

MILITARY.

Reported April 10th.

KILLED.—Driver, Lt. P. S., A.S.C., attd. R.F.C.; Fitzgibbon, Sec. Lt. H., R.F.C.; Ramsay, Sec. Lt. W. J., R. Welsh Fus., attd. R.F.C.; Turnell, Sec. Lt. R.D., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Starfield, Sec. Lt. B., R.F.C.

WOUNDED.—Cole, Lt. B. S., R.F.C.; Easton, Sec. Lt. H. E., Lond. R., attd. R.F.C.; Harman, Sec. Lt. H. H., R. Fus., attd. R.F.C.; Herring, Sec. Lt. R. S., Lond. R., attd. R.F.C.; Howitt, Lt. F. D., A.S.C., attd. R.F.C.; Irving, Lt. F. W., Lan. Fus., attd. R.F.C.; Jones, Sec. Lt. D. H., R.F.C.; Kock, Sec. Lt. A., R.F.C.; Leigh-Pemberton, Lt. R. D., G. Gds., attd. R.F.C.; Mitchell, Sec. Lt. J., Sco. Rif., attd. R.F.C.; Montgomery, Lt. R. M., R.F.A., attd. R.F.C.; Quigley, Capt. F. G., M.C., R.F.C.; Stewart, Sec. Lt. H. F., R.F.C.

MISSING.—Blyth, Sec. Lt. E. J., R.F.C.; Buswell, Sec. Lt. T. H., R.F.C.; Denovan, Sec. Lt. A. McN., R.F.C.; Hainsby, Sec. Lt. F. W., R.F.C.; Hollis, Lt. A., Hamps R., attd. R.F.C.; Leggatt, Sec. Lt. M., Lan. Fus., attd. R.F.C.; Saidler, Lt. W. T., R.G.A., attd. R.F.C.; Wharram, Lt. C. E., R.F.C.

Reported April 11th.

KILLED.—Miller, Sec. Lt. J. A., R.F.C.

DIED OF WOUNDS.—Finnemore, Sec. Lt. H. J. R., Suss. R., attd. R.F.C.; Hall, Capt. D. D. G., M.C., R.F.C. (Lt., Yorks. R.).

WOUNDED.—Arthur, Sec. Lt. H. N., R.F.C.; Bridge, Capt. M. F., A.S.C., attd. R.F.C.; Brown, Lt. J. V. R., A. and S. Highrs., attd. R.F.C.; Dunkerley, Lt. J. S., R.F.C.; Lindsay, Sec. Lt. R. E., R.F.C.; Pèttitt, Sec. Lt. M. S., R.F.C.; Pickles, Sec. Lt. S. H., Yeo., attd. R.F.C.; Symons, Sec. Lt. S. W., R.F.C.; Wedgwood, Lt. J. R.F.C.; Wells, Capt. W. L., Middx. R., attd. R.F.C.

MISSING.—Barford, Sec. Lt. K., R.F.C.; Cahusac, Capt. E. B., M.C., R.F.C. (Lt., S. Staff. R.); Child, Capt. H. R., R.F.C.; Gornall, Sec. Lt. G., R.F.C.; Harding, Sec. Lt. G. H., R.F.C.; Hedley, Capt. J. H., R.F.C.; Kennedy, Sec. Lt. R. D., R.F.C.; Kirkman, Capt. K. R., M.C., R.F.C.; Maxwell, Sec. Lt. W. S., R.F.C.; Pentecost, Sec. Lt. C. G., R.F.C.; Pickford, Sec. Lt. E. W., R.F.C.; Ransom, Sec. Lt. H. W., R.F.C.; Rentoul, Lt. A., Yeo., attd. R.F.C.; Rigby, Sec. Lt. T. F., R.F.C.; Sharpe, Capt. T. S., R.F.C (Sec. Lt., Glouc. R.); Smart, Sec. Lt. E. T., R.G.A., attd. R.F.C.; Smith, Sec. Lt. R. B., R.F.C.; Steel, Sec. Lt. R. A., Rif. Brig., attd. R.F.C.; Tanner, Capt. P. V., R.F.C.; Taylor, Sec. Lt. T., R.F.C.; Turner, Sec. Lt. E. S. F., Leins. R., attd. R.F.C.; Vaughan, Sec. Lt. D., R.F.C.; Watson, Sec. Lt. T., R.F.C.; Wedgwood, Sec. Lt. F. C. B., M.G.C., attd. R.F.C.; Westfield, Lt. F. J., Manch, R., attd. R.F.C.

CORRECTION.—In the casualty list of April 3rd Casswell, Lt. E. D. S., Rifle Brigade, attd. R.F.C. (reported killed), should read: Casswell, Capt. E. D. S., Rifle Brigade, attd. R.F.C.

CANADIAN FORCE.

ACCIDENTALLY KILLED.—Richards, Lt. J. W., B.C.R., attd. R.F.C.

WOUNDED.—Martin, Lt. J. B., B.C R., attd. R.F.C.; Rosborough, Lt. H. E., For. Corps. attd. R.F.C.; Ziegler, Lt. R. P., E. Ont. R., attd. R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Boyce, Lt. H. B. P., Sask. R., attd. R.F.C.; Heath, Lt. E. E., Cent. Ont. R. attd. R.F.C.

Reported April 13th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Cowie, Sec. Lt. G., R.F.C.
Pohlmann, Sec. Lt. R. P., R.F.C.

WOUNDED.—Deane, Capt. W., Norf. R., attd. R.F.C.; Harrison, Sec. Lt. A. R., W. Yorks R., attd. R F.C.

MISSING.—Nunn, Lt. F. A. W., Lond. R., attd. R.F.C.
Redpath, Lt. H. S., Arg. and Suthd. Highrs., attd. R.F.C.

CANADIAN FORCE.—MISSING.—Moses, Lt. J. D., Man. R., attd. R.F.C.

Reported April 15th.

AUSTRALIAN FORCE.—KILLED.—Sell, Sec. Lt. L. L. J., A.F.C.;
WOUNDED.—Brown, Lt. C. T., A.F.C.; Jeffers, Lt. J. P., A.F.C.; Kindred, Lt. G. H., A F C.

Reported April 16th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Hoyles, Sec. Lt. A. H. C., High. L.I., attd. R.F.C

* * *

CASUALTIES AMONG N.C.Os. AND MEN.
THE DATES ARE THOSE OF THE OFFICIAL LIST :—

KILLED.

APRIL 6th, R.F.C.—Cockburn, 68085. 2nd Cl. Air Mech., W. (Tantobie); Green, 2042, Flt.-Serjt. T. (Willenhall); Lem, 32573, 1st Cl. Air Mech. F. (Sheffield); McLeod, 402870, Cpl. A. (Glasgow).

PREVIOUSLY MISSING, NOW REPORTED BY THE GERMAN GOVERNMENT KILLED OR DIED OF WOUNDS.

APRIL 5th, R.F.C.—Beebee, 14956, Act. Cpl. A. (Birmingham).

DIED.

APRIL 4th, R.F.C.—Evans, 2450, Flt.-Serjt. A. E. (Cheadle).

APRIL 5th.—Hutchings, 22887, Flt.-Serjt. A. J. (Dunchideock); King, 35303, 1st Cl. Air Mech. G. S. (Scarborough); Wood, 96377, 3rd Cl. Air Mech. J. H. (Liverpool).

WOUNDED.

APRIL 4th, R.F.C.—Clark, 97361, 3rd Cl. Air Mech. J. W. (Walthamstow, E.); Downey, 51236, 3rd Cl. Air Mech. J. (Dublin); Edwards, 97363, 3rd Cl. Air Mech. C. (Leyton, E.).

APRIL 5th.—Egan, 21479, 1st Cl. Air Mech. S. (Catford, S.E.); Haigh, 36752, 2nd Cl. Air Mech. H. (Golcar); White, 40752, 2nd Cl. Air Mech. E. I. (Thornton Heath).

APRIL 6th.—Eden, 4713, Serjt. H. (Southwold); Hagan, 113763, Serjt. C. (Barrow).

MISSING.

APRIL 4th, R.F.C.—Swain, 75078, Serjt. F. J. (Wokingham).

APRIL 5th, R.F.C.—Guyat, 36287, 2nd Cl. Air Mech. J. G. (Kensington, W.).

PERSONAL NOTICES.

NAVAL.

DEATH.

GILLETT.—Flt. Sub-Lt. Howard Raymond Gillett, R.N., who was killed whilst flying in Kent on March 6th, was the only child of Mr. and Mrs. Raymond Gillett, 101, Broadhurst Gardens, N.W.6. He was 18 years of age.

ENGAGEMENT.

HOLMAN—BROWN.—An engagement is announced between Surgeon Alec George Holman, R.N., attd. R.A.F., of Westbury-on-Trym, Bristol, and Grace Kathleen, fifth and youngest daughter of the late Charles N. Brown and Mrs. Brown, of The Elms, South Town, Great Yarmouth.

BIRTH.

BUSH.—On Easter Day, at a Nursing Home, Brockley, to Hilda Madeline, the wife of the Reverend S. G. Bush, R.N., attd. R.N.A.S.—a son.

MILITARY.

DEATHS.

CUNNINGHAM.—Sec. Lt. F. J. Cunningham, 1st Canadian Contingent and R.F.C., died on April 6th at Westdene, Earley, Reading, the home of his parents, from illness contracted on active service. He was 29 years of age.

DILLON.—Sec. Lt. E. J. Dillon, Gen. List and R.F.C., was killed in a flying accident in Norfolk on April 12th.

Edward Joseph Dillon was the son of Mr. and Mrs. J. T. Dillon, of 149, Walm Lane, Cricklewood, N.W. He was born on Feb. 11th, 1895, and was educated at St. Edmund's School, where he was a good all-round sportsman.

He took a keen interest in aviation in the early days, and was a regular habitué of Hendon, where he assisted as a voluntary helper at race meetings, and there experienced his first flights as passenger.

He enlisted at the outbreak of war in the Royal Army Medical Corps, and served in the field in France and Greece for over two years, during which period he displayed great gallantry, and was awarded the Military Medal for taking wounded men to the rear under circumstances of difficulty and danger.

In the early summer of 1917 he was sent from Macedonia to England for transfer to the Royal Flying Corps, and proved himself an exceptionally able pilot, graduating to fast fighting scouts without a single breakage.

He had a quiet and lovable disposition, a strongly developed sense of humour, and was endowed with that natural modesty which is proper to true bravery. His untimely death has robbed the country of a pilot who would have done fine work.

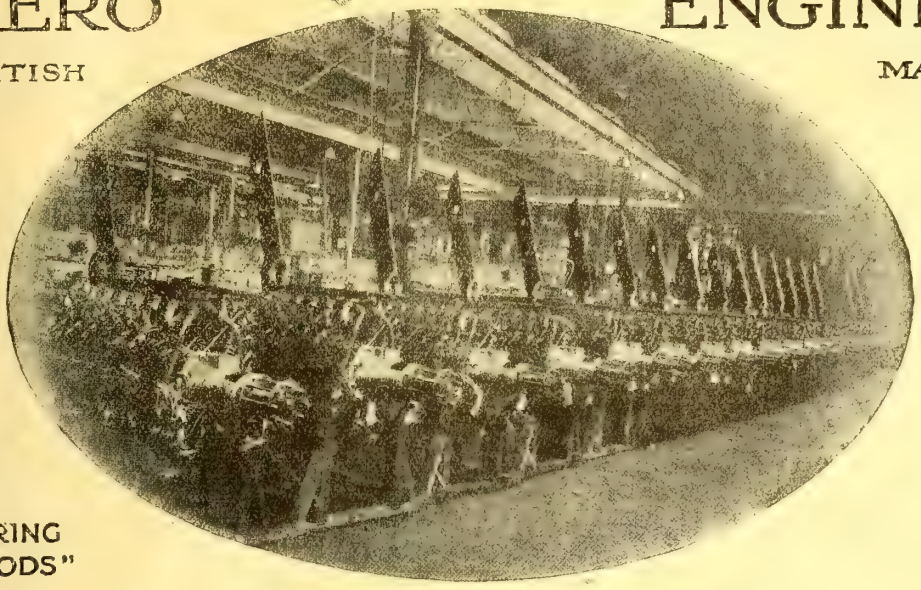
In this issue will be found an obituary notice concerning Sec. Lt. Wansey Smith, a Hendon comrade of Mr. Dillon's, who was recently killed flying on active service in France.

GAISFORD.—Capt. Robert Sandeman Gaisford, R.F.A., attd. R.F.C., is now officially reported killed in action on January 30th. He was 22 years of age, and younger son of Lt.-Col. D. J. Gaisford, of Dolly's Grove, Dunboyne, County

NAPIER

AERO ENGINES

BRITISH MADE



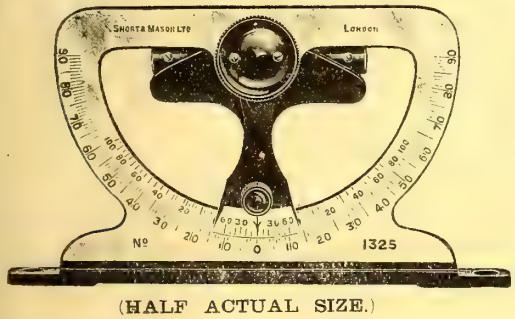
"DELIVERING THE GOODS"

D. NAPIER & SON LTD.

Works:-
ACTON LONDON W.

MOTORS

14 NEW BURLINGTON ST
LONDON W.



(HALF ACTUAL SIZE.)



(HALF ACTUAL SIZE.)

"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES
TO CLOSE LIMITS DURING

ASSEMBLING AND CONSTRUCTION.

HEIGHT MEASURING

ANEROID ALTIMETERS

FOR EVERY TYPE OF

AIRCRAFT

MANUFACTURED BY

SHORT & MASON, Ltd.,

ANEROID WORKS,
WALTHAMSTOW, LONDON, E.17.

Telegrams: "Aneroid, Phone, London."
Telephone: Walthamstow 180.

Meath. He had his captaincy in the Royal Artillery in January of this year, and he received his "wings" in August, 1917.

GREENALL.—Capt. Jack Eckersley Greenall, Yeo., attd. R.F.C., who was killed in action on March 31st, was 28 years of age and eldest surviving son of Mr. and Mrs. Henry Greenall, of The Elms, Moore, Warrington.

FINNIMORE.—Sec. Lt. H. J. Finnimore, R. Sussex Regt., attd. R.F.C., who died of wounds on March 27th, was the second son of Mr. and Mrs. J. A. Finnimore, 83, Park Road, Plumstead, S.E. He was 21 years of age.

LEDGER.—Sec. Lt. Harold Partington Ledger, R.F.C., eldest son of Mr. and Mrs. A. W. Ledger, of Canterbury, was killed in action on Nov. 20th, 1917, near Cambrai. He led his flight over the German lines at a low altitude, and immediately encountered a dense mist. Information received from the Geneva Red Cross states that he was shot through the heart. Mr. Ledger was educated at the Simon Langton School, Canterbury, and Christ's Hospital, West Horsham, 1907-1911. He joined the U.P.S. 18th Royal Fusiliers Batt. in April, 1915, and proceeded to France in Nov., 1915, and on his return after a cadet course at Oxford was gazetted to the R.F.C. in Sept., 1916. Mr. Ledger was 23 years of age.

STACEY.—Lt. John Randolph Stacey, Canadian Army, attd. R.F.C., who was killed in a flying accident at Hounslow on April 8th, was a "chief" of the Iroquois Indians and of five other North American tribes. He came to England with the Canadian Force, and gave promise that he would become a very able and skilful aviator.

At the inquest, held on April 10th, a verdict of "Accidental death" was returned. It was stated that he attempted to rise in a new machine before the tail left the ground, and afterwards crashed down.

SMITH.—Sec. Lt. Wansey Smith, East Lancs., attd. R.F.C., who was killed in action on April 2nd, was the only son of Mr. and Mrs. Wansey Smith, of 71, Queen's Avenue, Finchley, N. He was 26 years of age.

Mr. Wansey Smith enlisted in 1914 and went to France as an Army Cyclist in 1916. His gallantry in action and general ability won him a commission in the East Lancs. Regiment in 1917. On his return to England he joined the R.F.C., being seconded for duty as an observer. While in France as an infantry officer he had the unusual distinction of bringing down a low-flying German aeroplane with a rifle.

Old-timers at Hendon will remember Mr. Wansey Smith as a most ardent follower of aeronautical affairs. He was a regular habitué of the aerodrome, and gave his help freely wherever he could be useful as an amateur mechanic or propeller-swinger. Many of us regret that so promising a soldier should have gone out before having further chance for distinction in the aerial work with which he had so long been concerned.

His commanding officer writes: "He was doing a trench patrol at low level, when the machine was heavily fired at from the ground by enemy machine guns. From all evidence, it would appear that the pilot was hit and fainted, and falling on his controls, the machine dived steeply into the ground within our lines, being totally wrecked, and both occupants killed at once."

SWAINE.—Lt. Sidney W. Swaine, R.A.F., late R.F.A., was killed in action on April 4th.

WADE.—Lt. Richard Curtis Wade, R.F.C., who was killed in action on Feb. 26th, was the youngest son of Mr. and Mrs. H. S. Wade, Beckbury House, Shrewsbury. He was 19 years of age.

Engagements.

MOON—ROBERTSON.—The engagement is announced of Mr. N. L. Moon, Hussars, attd. R.A.F., second son of Mr. and Mrs. James Moon, Campden Hill Court, Kensington, and Mary Florence, second daughter of Sir Henry and Lady Robertson, Palé, Corwen, N. Wales

TAYLOR—LUMSDEN.—An engagement is announced between Capt. S. G. C. Taylor, R.F.C., only son of Mr. and Mrs. Sinclaire Taylor, of Bettws, Wales, and Kathleen (Kay), only daughter of Mr. and Mrs. T. Lumsden, of Dartmouth Lodge, Low Fell, Durham.

Marriages.

DUNVILLE—COMBE.—At the Guards' Chapel, on April 9th, Mr. Robert Dunville, Grenadier Guards, eldest son of Lt.-Col. John Dunville, R.A.F., was married to Phyllis, elder daughter of Capt. and Lady Jane Seymour Combe.

HUNTER-PEARSON.—The marriage between Major H. T. V. Hunter, M.C., Rifle Brigade and R.A.F., and Ethel Elizabeth, widow of the Hon. Francis Geoffrey Pearson, youngest son of Viscount Cowdray, took place on Thursday, April 11th.

Births.

BEACHCROFT.—On April 14th, the wife of Maurice Beachcroft, Barrister-at-Law (Temp. Capt., R.G.A., S.R., and R.A.F.), of Uplands, The Ridgeway, N.W.4, of a daughter.

FRY.—On Friday, April 5th, at Greengates, Filton, Glos., to Olave, wife of Lt. C. R. Fry, R.F.C.—a son.

WHITTAKER.—On April 13th, to Elsa, wife of Capt. W. E. de B. Whittaker, the King's Regt., of a son.

* * *

Will repatriated officers and men who may have seen Lt. Streather, R.F.C., in Germany, please to write his mother at D'Arcy House, Finchley Road, Golders Green, N.W.

AIR FORCE.

Deaths.

ENGLAND.—Lt. Norman Herbert England, R.A.F., who was accidentally killed in a flying accident on April 7th, was the son of Maj. F. H. England, late Royal Welsh Fusiliers, and Mrs. England, 29, Campden House Road, Kensington. He was 31 years of age.

JONES.—Lt. Benedict Henry Melvill Jones, R.A.F., who was killed whilst flying on April 4th, was the youngest son of Mr. and Mrs. Benedict Jones, of the Red House, Ashstead, Surrey. He was 20 years of age.

LAKE.—Lt. Harold Caldecott, R.A.F., who was accidentally killed on April 5th, whilst flying in England, was the elder son of Mr. and Mrs. James C. Lake, of 84, Rodenhurst Road, Clapham Park, S.W.4, and 13-15, Little Sutton Street, Clerkenwell, E.C. He was 21 years of age.

STODDART.—Sec. Lt. George B. Johnstone Stoddart, R.A.F., who was accidentally killed while flying abroad, was the son of Mrs. Stoddart and stepson of Dr. W. H. B. Stoddart, of Harcourt House, Cavendish Square, W. He was 18 years of age.

Engagement.

RODWELL—CLARKE.—The engagement is announced between Lt. Denham E. Rodwell, R.A.F., second son of Mr. and Mrs. H. Edgar Rodwell, 100, Philbeach Gardens, Earl's Court, London, and Nesta, only child of the late Robert T. A. Clarke and Mrs. Clarke, of Warwick House, St. Mary Borne, Hants.

Marriages.

GREENWELL—CATCHESIDE.—On April 9th, at All Saints' Church, Gosforth, Northumberland, Lt. Thomas George Greenwell, R.A.F., only son of Mr. and Mrs. T. W. Greenwell, "Northwood," Sunderland, was married to Mabel Winifred, elder daughter of Mrs. T. H. Catcheside and the late Mr. T. H. Catcheside, J.P., Inglewood, Gosforth, Northumberland, by the Rev. W. W. Kennedy, M.A.

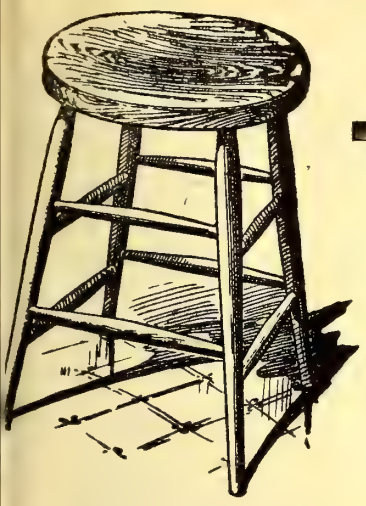




TRADE MARK

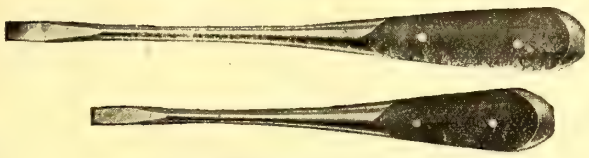
ASCOL

REGISTERED.



FACTORY STOOLS
(Wood).

24in. high - **6/6** each.

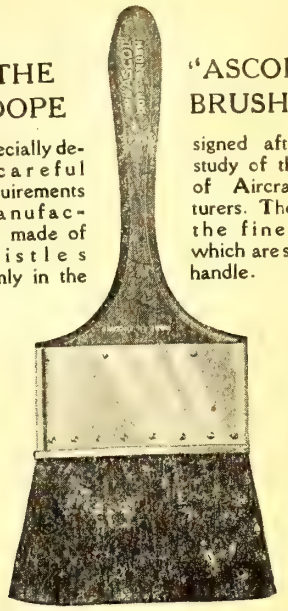


SCREW DRIVERS.

Size.				Per doz.
6in.	..	..	..	**8 9**
8in.	..	..	..	**13/-**
10in.	..	..	..	**16/6**

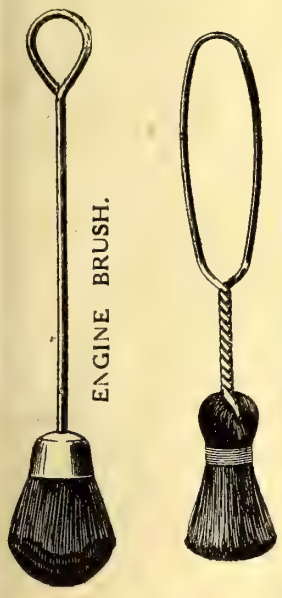
THE DOPE BRUSH.

Specially designed after a careful study of the requirements of Aircraft Manufacturers. They are made of the finest bristles which are set firmly in the handle.



Size.		Each
2in (Aluminium bound)	..	**2/6**
2in (Tin bound)	.. ..	**2/5**
3in. „ „	.. ..	**3/9**
4in. „ „	.. ..	**5/-**

BRUSHES.



	Per doz.
Scratch Brush (4-row) ..	**16/-**
Engine Brush, 10 in. (Fibre)	**8/6**
„ „ „ (Hair)	**9/6**
Mop (Sud)	**4/2**

You can have Delivery of any of these "Ascol" Specialities Now.

"ASCOL" LEAFLETS We have now ready a large range of illustrated leaflets dealing with "Ascol" Specialities. These include "Ascol" Micrometers, Factory Stools, File Cleaners, Avro Parts (Washers and Eyebolts), Safety Belts, Dope Brushes, etc., etc. The leaflets are supplied in a neat and useful case, and will be sent free to the industry upon application on business stationery.

Telephone GERRARD 276 (2 lines).

THE
AIRCRAFT SUPPLIES COMPANY LTD

Telegrams "UPCAST, RAND," LONDON.

Contractors to the Air Board.

"Ascol" House, 125, Long Acre, LONDON, W.C.2.

Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties, and Scotland, South Coast and the London District.

Works—LITTLE JAMES STREET, LONDON, W.C.1.

MANAGING DIRECTOR ... ... G. H. MANSFIELD.

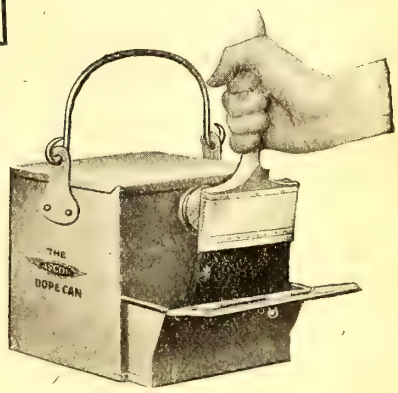
S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

THE "ASCOL" DOPE CAN.

Regd. Design 663563.

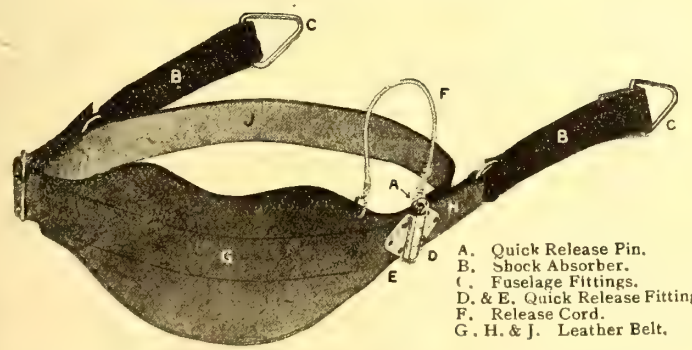
Has been specially constructed with a view to economising dope. The brush can be strained before being taken out of the can. The can is easily filled, and is constructed to hold the right amount of dope for a morning's work. It is made for hard and rough wear, and will be found exceedingly handy, durable, and invaluable for doping purposes.

Can be supplied with manufacturer's own name on can without extra charge.



Showing Brush being strained ready for use.

"ASCOL" SAFETY BELTS.



A. Quick Release Pin.
B. Shock Absorber.
C. Fuselage Fittings.
D. & E. Quick Release Fitting.
F. Release Cord.
G. H. & J. Leather Belt.

As Supplied to the Norwegian and Japanese Governments.

42/- each nett.

STEINBERG—GOING.—On April 10th, at Brompton Parish Church, Capt. Herbert E. Steinberg, R.A.F., son of the late Geo. H. Steinberg, and Mrs. Steinberg, of Hampstead, was married to Edith Mayne, only daughter of R. E. Going, Esq., and Mrs. Going, of 51, Kensington Hall Gardens, and granddaughter of the late John Going, of Cragg, Tipperary, by the Rev. A. Hamilton King.

THOMPSON—ABBOTT.—On April 9th, at St. Mary Abbot's, Kensington, quietly, Lt. Aubrey William Thompson, R.A.F., youngest son of H. C. Thompson, of Buenos Aires, was married to Mary Ellen Abbott, younger daughter of the late Mrs. John Venables Abbott.

BIRTH.

HUSSEY.—On April 12th, at 61, Imny Street, Orford, Suffolk, the wife of Sec. Lt. H. H. Hussey, R.A.F., a son.

INTERNED OFFICERS.

The following officers were reported by the "Times" correspondent on April 10th to be among those who have arrived in Holland from Germany for internment:—

D'Arcy Levy, Flt. Lt. J. M., R.N.A.S
Dobell, Lt.-Comdr. H., R.N.V.R., attd. R.N.A.S.
Dolling-Smith, Sub-Lt. G. H., R.N.A.S.
Dalzell, Flt. Lt. W. A. K., R.N.
Petter, Flt. Lt. R. C., R.N.

* * *

The "Times" correspondent at The Hague writes on April 10th that the following officers are among those who have arrived in Holland from Germany for internment:—

Broder, Capt. P. A., 5th Worc. R. and R.F.C.
Crabbie, Lt. W. M., R.F.A., attd. R.F.C.
Eberli, Capt. F. H., R.F.C.
Greenhow, Lt. M. W., W. Yorks R., attd. R.F.C.
Leeche, Capt. J. C., 8th Hrs., attd. R.F.C.
Stubbs, Lt. H. B., R.F.C.
Spratt, Capt. N. C., R.F.C.
Scholefield, Capt. E., R.F.C.
Tudor-Hart, Lt. W. O. T., R.F.C.
Weir, Capt. A. G., R.F.C.

* * *

Reuter's correspondent at The Hague writes on April 9th that the following officers are among those who arrived at Scheveningen on April 8th:—Capt. Hunt, R.F.C.; Lt. Heppell, R.F.C.; Lt. Neill, 3rd Bn., Roy. Scots, attd. R.F.C.; Sec. Lt. Cook, R.F.C.; Sec. Lt. Leckler, R.F.C.; Sec. Lt. Mitchell, 7th Bn., Innis. Fus., attd. R.F.C.; Sec. Lt. Ordish, R.F.C.; Sec. Lt. Talbot, R.F.C.

FOREIGN COMMUNIQUES.

FRANCE.

April 9th.—Army of the Orient.—Enemy encampments were bombarded by British aviators to the south-west of Demir Hissar.

April 10th.—It is confirmed that four more enemy aeroplanes were brought down by our pilots on March 31st and April 2nd and 6th. A fifth was accounted for by the anti-aircraft defences.

April 11th.—During the day of April 10th two German aeroplanes were brought down by our machine-gun fire.

During the month of March 26 German aeroplanes were brought down by the anti-aircraft defences, eight during the night. To this number must be added two aeroplanes brought down by the Paris defences during the raid of March 11th-12th.

April 12th.—On April 11th our chasing aeroplanes fought numerous actions, in the course of which two German aeroplanes and a captive balloon were brought down.

Twelve other enemy machines were gravely damaged and fell in their lines.

The same day our squadrons dropped 16,000 kilogrammes (about 16 tons) of projectiles on the station of St. Quentin and on the depôts and aviation ground in the region north of Montdidier. A furious conflagration destroyed the hangars of Champien.

A fire and an explosion were observed in the station of St. Quentin.

It is confirmed that an enemy aeroplane and captive balloon were destroyed on March 23rd and two aeroplanes on March 31st.

April 13th.—During Friday our aviators, taking advantage of the fine weather, displayed great activity on the whole of the front, especially in the Somme and Oise regions.

Our chasing machines made over 350 flights and fought 120 actions. Eight enemy machines were brought down, and 23 others fell in their own lines badly damaged. In addition, five enemy captive balloons were burnt, and five others were so badly riddled with shot that they had to be hauled down quickly.

Our bombarding machines were also busy during the day of the 12th and the following night. In all, 48,000 kilogrammes (about 48 tons) of projectiles were dropped during these expeditions, in which Italian aircraft took part. The railway stations of Jusy, Roye, St. Quentin, Nesle, Ham, Guiscard, and Noyon, the railway tracks, the cantonments, and numerous convoys in these regions, as well as the railway stations of Hirson, Laon, and Montcornet, were copiously bombarded. Several fires and some explosions were observed.

April 15th.—On April 13th and 14th four German aeroplanes

WINGED WARFARE

by

Major W. A. BISHOP

V.C., D.S.O., M.C.

The greatest of our young fighting airmen begins the vivid personal story of his adventures and exploits in the air exclusively in this week's

ANSWERS

2D. War-time Price. War-time Price, 2D.

In the short but glorious history of the Air Service, the name of Major Bishop will be recorded as one of the most dreaded fighters ever encountered by the Germans. No fewer than forty-five enemy machines were undoubtedly destroyed by him, and he has been victor in a hundred other fights. He is one of the few men whose decorations include the V.C., the D.S.O. (twice won), and the M.C.

The Paper that is always at the Front

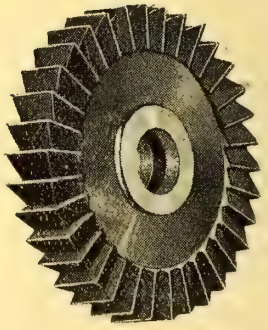
2D. ANSWERS. 2D.

TWIST DRILLS



MILLING CUTTERS

QUICK DELIVERIES.



CENTRE DRILLS.

SEND US



YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,

32, Queen Victoria St., London, E.C.4.

'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.

THE SUPER-AVIATION CO. LTD.

Aeronautical Designers, Constructors and General Engineers.

MANUFACTURERS OF

COMPLETE

MACHINES

and SPARES

CONTROLLED ESTABLISHMENT under the WAR MUNITION ACT.

HEAD OFFICE and WORKS:—

DOLLIS HILL WORKS,
DUDDENHILL LANE,
WILLESDEN, N.W.10.

Telephone : WILLESDEN 642.
Telegrams : "SUPAVICOL," LONDON.

Managing Director—N. LEWIN, A.C. Mech. E.

were brought down, two of them by the fire of our machine-guns. Our bombing machines dropped 3,000 kilogrammes (about three tons) of bombs on the enemy establishments and convoys in the region of Montdidier.

Army of the Orient.—Twenty British aeroplanes on Saturday bombarded the aerodrome of Hudovo (in the Vardar Valley). It is confirmed that two enemy chasing aeroplanes were brought down in the course of this operation.

British aviators yesterday bombarded the depôt of Kakara (seven miles S.E. of Seres), causing the derailment of a train.

GERMANY.

April 9th.—The losses in March of enemy aerial fighting forces on the Western theatre of war amount to 23 captive balloons and 340 aeroplanes. Of the latter 158 were brought down behind our lines, the others were observed to fall within the enemy positions.

We lost 81 aeroplanes and 11 captive balloons.

April 12th.—British naval forces, consisting of monitors, torpedo craft, and aircraft, undertook an attack on the coast of Flanders on the night of April 11th. Ostend was bombarded with guns of heavy calibre, and Zeebrugge was bombed by aircraft. The attacks were beaten off without trouble by our batteries. No military damage was anywhere done.

April 14th.—In air battles during the last few days 37 enemy aeroplanes and three captive balloons were shot down. Lt. Monckhoff gained his 24th aerial victory.

In the night of April 12th Capt. Strasser with one of our marine airship squadrons attacked important storage, manufacturing, and shipment places of war industry in central England. Birmingham, Nottingham, Sheffield, Leeds, Hull, and Grimsby were bombed. Despite the extraordinarily strong gunfire encountered and pursuit by aviators all the airships returned safely.

ITALY.

April 9th.—An enemy machine was shot down by one of our aviators above S. Lucia di Piave.

April 13th.—An enemy aeroplane was forced to land by a British aviator in the neighbourhood of Cimadolmo (Piave).

THE WAR IN REVIEW.

Cavalry versus Aeroplanes.

A cavalryman writes of the recent retreat on the Somme:—

That night we crossed the canal and again joined up with the French, who prepared the bridges for blowing up, for it was

Aeroplane General Sundries, Ltd.

Manufacturers of

AEROPLANE & AERO ENGINE FITTINGS

A.G.S. Bolts a Speciality

All kinds of small turning and repetition work undertaken at short notice.

A.I.D. INSPECTION AT WORKS.

Telephone— Holborn 4959.

Telegrams— Zeppishout, Holborn, London.

Registered Office— FULWOOD HOUSE, FULWOOD PLACE, HIGH HOLBORN, LONDON, W.C.

Of special interest to Government Contractors.

J. B. BROOKS & Co. Ld.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments, and Cases of

LEATHER

J. B. Brooks & Co. Ltd. 104 Criterion Works Birmingham.

THE USE OF

NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work

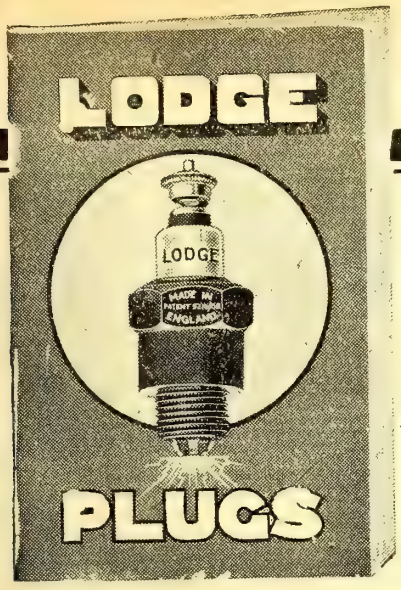
Wood fillers, Stains, Air screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.

Contractors to all Government Departments.

Offices: 407/9, OXFORD St., LONDON, W. Works: SOUTHALL MIDDX.



Illustrated Catalogue post free from the Sole Manufacturers—

THE LODGE SPARKING PLUG CO., LTD., RUGBY.

Contractors to the Admiralty, War Office, Air Board, and Ministry of Munitions

Entire output of LODGE AERO PLUGS reserved for British and Allied Governments.



VIEW OF PREMISES—TOTAL FLOOR SPACE 28,700 sq. ft.

FOR SALE.

Valuable Freehold MANUFACTURING PREMISES AT GUILDFORD.

(Two minutes' walk from Guildford Station—three railways.)

SUBSTANTIAL AND OF FIRE-RESISTING CONSTRUCTION,
ELECTRICALLY LIGHTED, STEAM HEATED, OWN WATER SUPPLY.
Three Floors, served by 3-Ton Power Lift.

For Terms and Permission to View apply to—

'Phone: 575 GUILDFORD.

DENNIS BROS., Ltd., GUILDFORD.

evident that we could not hope to beat back such a force as was against us. Next morning we blew up one of the bridges, and moved to make a local counter-attack, for Fritz's machines, which were flying close above our heads, signalled to his artillery, and they opened a pitiless fire on us while still in close formation. We again had to retire, while Fritz's guns and aeroplanes gave us the worst half-hour we had had. Our losses were again very heavy.

Meteorological Effects.

The "Times" correspondent writes from G.H.Q. on April 12th, concerning the German advance towards Bailleul, as follows:—

The weight of the German artillery is very great, and his advance has not been so rapid that, with the favourable weather of the last two days, the enemy has had any difficulty in keeping his guns up. The weather, indeed, has been ideal for his attack, being fine and dry, with sufficient mist to rob us of the advantage of aeroplane supremacy. To-day, however, visibility is perfect, and from the swarms of our aeroplanes I saw in the sky I have no doubt that the Royal Air Force is once more coming into its own.

* * *

The special correspondent of the "Morning Post," writing from France on April 15th, says:—

I hear the airmen referred to repeatedly for their successful efforts in locating the German attacks during the fighting around Bailleul. As one officer said: "They've been flying down right to the muzzles of the machine-guns," and keeping our artillery informed of every fresh concentration. The enemy cannot cover his assembly places, and the formation of large bodies of infantry is detected almost as readily as a demonstration in Trafalgar Square. Yesterday and to-day the airmen have been dropping bombs on columns from a height of a hundred feet. One airman, asked the result of one such expedition, said: "Well, I saw a lot of holes in the column, and there appeared to be a lot of excitement."

The Bombing of Paris.

On April 12th a number of German aeroplanes crossed the lines in a southerly direction. Only two of them succeeded in flying over the Paris district, where they dropped a few bombs. It was officially stated later that 24 persons, of whom six were men and 15 women, were killed in the raid, while 62 persons were wounded.

A considerable amount of material damage was done.

The warning was given at 10.10 p.m., and the "all clear" at 10.40.

Camouflage.

A message from Paris, dated April 15th, states that the last Gotha raid on Paris was not an expedition. It was an individual enterprise, and the watch kept by the listeners was frustrated in a remarkable manner.

Being probably on the alert above his own lines, the German aviator took advantage of the presence of a French bombarding squadron to accompany it. On this particular evening the French aviators were very active, and dropped 60,000 lbs. of explosives on enemy military objectives.

Consequently, there was a large number of aeroplanes about. The German, therefore, passed over his own lines in the wake of the French aeroplanes which were returning towards the south, approached them as nearly as possible so that the sound of his motor should be confounded with that of our machines, and then at the propitious moment made a bend towards the south-east, and soon was over Paris.

As soon as it quitted the French squadron it was recognised and the warning given by the listening post, but the time taken up by the telephonic communication to give Paris the alarm was exactly the same as was required by the Gotha to reach the city.

Auster (1914) Ltd

for AUSTER-TRIPLEX SHIELDS
AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

BIRMINGHAM:
Crown Works, Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

ELECTRIC CABLES



E. KALKER & CO.,
COVENTRY.

AEROPLANE



ACCESSORIES

7 Years' Experience.

BELLING
ELECTRIC GLUE POTS
for Aeroplane and other work



List No 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY: 2 pints of glue.
LOADING: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.
MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.

Where Flying Men are fitted out.



"..... All our Machines Returned Safely"

BALD official phrase, read by the man in the street with a joy none the less deep for his imperfect realisation of what it implies.

Not a single cold-benumbed hand failed at the controls, no eye or brain was so dulled with bodily misery that the faint grey smudges below lost their meaning as bearings

He, the Airman, alone knowing what these dark and perilous excursions mean—he it is who alone realises the vital urgency of securing the world's best flying kit. He is the man you meet at *Dunhills*.

It weighs with him that *Dunhills'* experience in air-kit making—and that goes both to the infancy of flight—is backed by an earlier (and a long and distinguished) experience in the kindred problem of kit-making for motorists.

LEATHER COMBINATION SUIT
Lined soft, snug camel fleece.

	To knee.	To ankle.
Tan Leather	**9 gns.**	**10 gns.**
Black ,,	**10** ,,	**11** ,,

Made with Map and other deep, useful pockets.

The Aviation Catalogue gives the res of the kit, so send a card for a copy.

Dunhill's
LIMITED.
2, Conduit Street, London, W. 1.
MANCHESTER: 90 and 92, Cross Street.
GLASGOW: 72, St. Vincent Street.

The Raid on Zeebrugge.

A correspondent of the "Morning Post" writes from Amsterdam that late on April 11th and early in the morning of April 12th a violent air raid by Allied aeroplanes was made over Zeebrugge and the vicinity. Many heavy bombs were dropped, causing considerable damage. It is believed that some submarines have been hit and partly destroyed. None of the raiding machines was hit by anti-aircraft guns.

A French aeroplane which took part in the raid was obliged to descend on Dutch territory. The occupants, who set fire to their machine, were interned.

The Absence of Air Raids.

Mr. G. H. Perris, writing from the French Front on April 10th, says in the "Daily Chronicle":—

An aviator captured attributes the momentary suspension of the Gotha raids on London to the disproportion between the results obtained and the losses suffered either during the raids or in landing on the return. Another traced it to the requirements of the offensive. But except at the beginning, when they kept up with the advance, and reported pretty well on the whereabouts of our retreating troops, the German aviators have certainly not shone, whereas the feats of our own aviators are so numerous, and in some cases so romantic, that it is difficult to do justice to them.

A better explanation of the absence of raiders from London of late is probably to be found in the extreme daring and the success of the French and British bombardment squadrons. Many illustrations of the effectiveness of their raids on aviation grounds and other military works behind the German front could be given.

A peculiarly satisfactory instance is that of the French expedition which threw many tons of projectiles on the aviation ground of Frascaty, near Metz, and the poison gas factory of Ludwigshafen, Mann-

WOOLER ENGINEERING CO. LTD

Specialise in MACHINED METAL FITTINGS, and can quote for PROMPT DELIVERY your requirements in EYE BOLTS, SOCKETS, ELEVATOR and FLAP LEVERS, HINGES, &c.

Do you want your Stampings and Castings Accurately Machined? Send us your enquiries.

Large Stock of All Sizes R.A.F. No. 3 A Spec.
Limited Stock R.A.F. No. 1 E Spec.

Offices and Works:
OLD OAK COMMON LANE,
WILLESDEN JUNCTION, N.W. 10.
Phone: Willesden 117 Telegrams: Two Stroke, London.

Just published. 360 *pp. with Illustrations.* 4½ *in. by* 6¾ *in., limp cloth. Price* 6/- *net (postage,* 4d.).

The Aviation Pocket Book for 1918.

By R. BORLASE MATTHEWS, Assoc.M.Inst.C.E., F.Ae.S.

Containing data on Aeroplane Theory and Design, Air Pressure and Resistance, Structural Materials, Engines, Typical Aeroplanes, Piloting, Rigging, Meteorological Data, Scouting and Signalling, etc., etc. With Glossary and other information of value to all interested in Aviation.

Prospectus on Application.
London: CROSBY LOCKWOOD & SON, 7, Stationers' Hall Court, E.C.

'FEARLESS' ENGINE CLEANING BRUSHES

As used by the R.F.C.



Send Trade Card for FREE SAMPLE.

FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD. LONDON —— N.16.



Aeroplane Construction

In aeroplane construction the vital factor is "how many machines can be turned out in a given time." This depends entirely upon the efficiency of the machinery employed. And **no** machine reaches its highest point of production until its clutches, brakes, etc., are fitted with Ferodo Fabric.

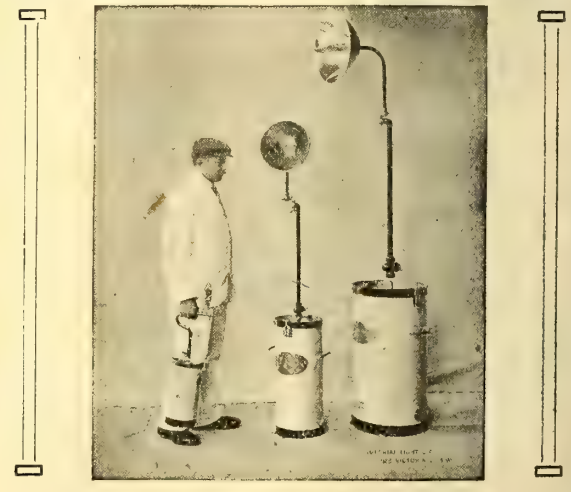
Ferodo Fabrics are the most efficient transmitters of energy. Leather, wood, textile beltings, etc., are out of date for Friction drives and Braking purposes. The moment they become soaked with oil they are useless; Ferodo Fabrics never slip, never seize; are not affected by water, oil or acid, and are absolutely reliable under all conditions.

THE HERBERT FRODO CO. LTD.
Works: CHAPEL-EN-LE-FRITH.

Contractors to the War Office and Admiralty, London General Omnibus Company, and Underground Electric Railways of London and Paris.

Depots at London, Birmingham, Belfast, Bristol, Cardiff, Edinburgh, Glasgow, Liverpool, Manchester & Newcastle.

FERODO
Friction Surfaces.



Large numbers of these three types have been supplied.

IMPERIAL LIGHTS
— FOR —
AERODROME LIGHTING

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.
Telegrams— "Edibrac, Phone, London." Telephone— Victoria 3540 (3 Lines)



Munitions

Undoubtedly the production of munitions both in the matter of the quantities required and the exactitude demanded in the interests of the Nation, has made essential the use of the best and most modern Machinery and Plant.

We have found it so, and our experience during the War period will be to us of the utmost value in the **Post War** period.

In those days we shall be able to increase our output materially, and still maintain that excellence that has always been associated with the products of the house of

SUCKLING

Wm. Suckling & Sons

KINGSWAY HOUSE, ALBION ST., BIRMINGHAM.

LONDON: MORLEY HOUSE, HOLBORN VIADUCT :: E.C.1.

1256

heim—the largest of its kind. A prisoner states that at Frascaty a great hangar was destroyed, with 17 aeroplanes. As for the "Soda Anilin Fabrik," in Mannheim, the manager has stated in Switzerland that it was almost completely destroyed, and that the gas manufacture was altogether suspended.

[Mr. Perris has evidently very waffley ideas on aerial affairs. The absence of air raids has been chiefly due to the weather, and secondarily to the "requirements of the offensive," as the German said. These requirements would be the night-bombing of back areas, and so would have nothing to do with the reconnaissance and infantry contact work at which Mr. Perris scoffs. One hopes that the last paragraph contains the elements of truth.—Ed.]

The Policy of Aerial Bombardment.

A Karlsruhe telegram, published in the "Frankfurter Zeitung" of April 12th announces that the Second Chamber of the Bavarian Diet has unanimously passed a resolution proposed by the Social Democrats requesting the Government to endeavour to get the Federal Council and the Imperial authorities to try to bring about general agreements for the cessation of aerial attacks on places outside the area of military operations. A representative of the Bavarian Government welcomed the motion, saying that the Ministry of the Interior was already in communication with the Ministry of War regarding this question.

The Allies' aerial attacks are still giving the inhabitants of Southern Germany food for thought. According to a Mainz telegram to the "Frankfurter Zeitung" of the same date, a motion by Herr Adelung regarding an enemy aerial attack on Mainz was considered on April 10th at the sitting of the War Committee of the Second Hessian Chamber. The Minister for Foreign Affairs, Dr. von Ewald, made a long reply, but the proceedings were declared confidential. Herr Adelung finally suggested that the Hessian Government should urge on the Empire an agreement between the belligerents to avoid aerial attacks on places outside the war zone.

Fire at Friedrichshafen.

A Reuter's message states that a telegram from Romanshorn, southern side of Lake Constance, opposite Friedrichshafen, reports that the great shed at Manzell, near Friedrichshafen, the original home of the Zeppelin airships, was completely destroyed by fire on April 13th, along with the adjoining inn. The fire is supposed to have been due to an explosion. The flames were visible throughout Eastern Switzerland.

An Attack on Kastelorizo.

A German submarine fired seven shells on April 10th against the small island of Kastelorizo, near Rhodes Island, occupied by

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.



FIRST IN 1880 FOREMOST EVER SINCE.

PROMPT DELIVERY AGAINST "A" CERTIFICATE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,
NEW CROSS, LONDON, S.E.

HIDE GLUES FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.

— APPROVED —

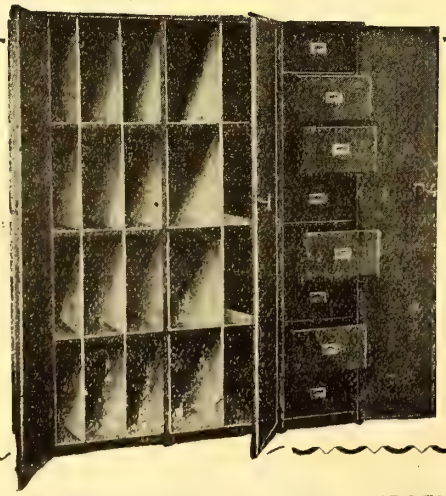
Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

Lang Propeller LTD.

Contractors to the Admiralty and War Office.

WEYBRIDGE, SURREY.



SANKEY

Fireproof Steel Storage, Bins, Clothes Lockers, Tool Chests

Write for Details—

Joseph Sankey & Sons, Ltd.,
Hadley Castle Works,
WELLINGTON, Shropshire.

Seaplanes and Land Machines.

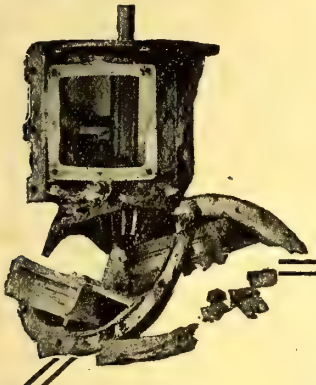
Contractors to
THE AIR COUNCIL.

The BLACKBURN AEROPLANE and MOTOR CO., Ltd.,
LEEDS
And at Hull.

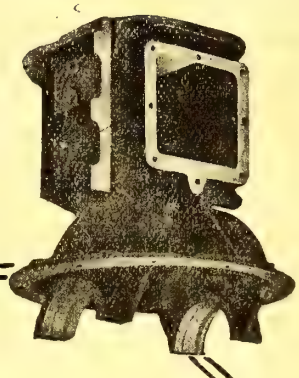
"Always at the Front."

Blackburn AIRCRAFT

Steele & Hawksley.



Rule-of-thumb methods will not serve to-day.



It is regrettable, but nevertheless true, that such unsatisfactory methods are still practised to-day, and more to be regretted from the point of view of our particular industry that they are practised by some self-called welders. We constantly receive jobs on which attempts have been made to effect some necessary welding repair, resulting in utter failure, with the incompetence of the repairer written all over them; the consequence is that the cost of putting the matter right is more than it would have been had the job been entrusted to us in the first instance, and, in some cases, the casting is ruined beyond the hope of repair.

It is *quicker, cheaper,* and more *satisfactory* in every way to send your repairs to a firm of Known reputation. There is no firm with a better name than

The New Welding Co.

The wreckage shown in the left-hand corner was once an aluminium gearbox from well-known make of car. The owner feared his car would be permanently off the road, as a new box could not be obtained. Hoping against hope, he brought it to THE NEW WELDING CO. The repair of equally bad smashes comes as a matter of course to the technical experts of THE NEW WELDING CO., and the repair in question did not alarm them in any way. The job went through the necessary operations, and in due course was completed as shown on the right. But the owner was so delighted that he expressed himself as having found in actual practice that THE NEW WELDING CO.'s repairs were everything, and more than the very flattering opinions he had previously heard concerning them.

THE NEW WELDING CO., 26, Rosebery Avenue, London, E.C.1. 'Phone—5252 Holborn.
'Grams—"Windoneeda, Holb, London."

the French. When the bombardment began an enemy aeroplane appeared over the island and dropped two bombs.

The R.F.C. in East Africa.

A correspondent of the "Times" writes on April 10th:—In connection with General Van Deventer's dispatch the following story of how the enemy force in German East Africa under Tafel came to be captured is of interest:—

A certain officer of the R.F.C. was out on a reconaissance in the region of the Rovuma River, but found "nothing doing." Having to land, he thought it wise first to get rid of his "eggs," so he chose a quiet spot and dropped them, causing, of course, considerable noise of explosion. He then flew home. Tafel was then marching to join his chief, von Lettow, but, hearing these explosions, he diverted his line of route considerably (from south-west to south-east), and before long bumped into a British force. Ultimately his whole force, some 3,000 strong, surrendered, as General Van Deventer reports.

The aviator learned the result of the unloading of his "eggs" some time afterwards.

Hill Tribe Troubles.

The "Times" correspondent, writing from Simla on April 6th, says:—The news from the North-West Frontier continues to be satisfactory. Aeroplanes have been effectively used in the operations against the Marri tribe in Baluchistan.

Casual Observations.

One who reads the papers has a rare collection of tit-bits to disgust him this week.

A correspondent in Russia who so far has been very well-informed on things there, judged by what we already know, writes that 10,000 aeroplane motors have been discovered hoarded up for the conquering Huns in Petersburg.

Other officially authorised rumours talk of irregularities in connection with the American contracts for supplies of aero material for factories.

There is a feeling that the "war-scandal" business has been overdone. Anyway, no nation seems immune, so it must be inherent in humanity, kultured or not so.

Talking of the former, Munich is said by yet another newspaper to have formed an enormous company for promoting Aerial Transport. The Bavarian towns have taken up all the shares, for they hope that Munich will become the hub of the Trans-European flying routes. An example of what such an aerial port should be is planned as a future glory of that city.

T. S.H.



Suits Aviation

THE "Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd.

The Linen Hall, Regent Street, London, W.

VENUS PENCILS

IT is important to know that you cannot buy a faulty Venus Pencil—no imperfect lead is ever sent out of the factory. The lead of all the 17 degrees is brought to the highest pitch of excellence and encased in selected straight-grained cedar wood. These points make for economy.

17 Grades, 6B (Softest) to 9H (Hardest) Blacklead—also Copying.

OF ALL STATIONERS, STORES, ETC., THROUGHOUT THE WORLD

"VENUS," 173/5, LOWER CLAPTON ROAD, E.5.

VENUS

Bowden

BOWDEN CONTROLS AND BOWDEN CABLES FOR ALL AEROPLANE PURPOSES.

Quotations on application.

Note Address—

The BOWDEN BRAKE Co., Ltd., Tyseley, B'HAM.

BOWDEN TYSELEY

Tyseley



TERRY

accuracy

—·000 + ·001

MICROMETER accuracy o/a. — whenever essential —is a TERRY assurance

We are open to accept orders for springs, press-work, wirework — any pattern, finish or any quantity. Write us.

HERBERT TERRY & SONS, Ltd
The Spring and Presswork Specialists, REDDITCH, Eng.
Phone: 61 Redditch (4 lines).



Dope Room Temperature and Air Change

to conform to Home Office requirements.



Covering Room Conditions

to meet official approval.

Sturtevant Heating and Ventilating Apparatus will give the required conditions. Over 70 Aircraft Factories have been equipped with Sturtevant Plant with entirely satisfactory results. We shall be pleased to place the services of our Aircraft Department at your disposal to assist you with your requirements in this direction.

Ask for Catalogue W1063.

Sturtevant
Engineering Co., Ltd.,
147, Queen Victoria St., London, E.C.4.

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.G.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

Telephone: 1153 and 1154, KINGSTON. Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.

THE MIDLAND MOTOR CYLINDER Co. LTD.

SMETHWICK
TELEPHONE—289 SMETHWICK

NR. BIRMINGHAM
TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

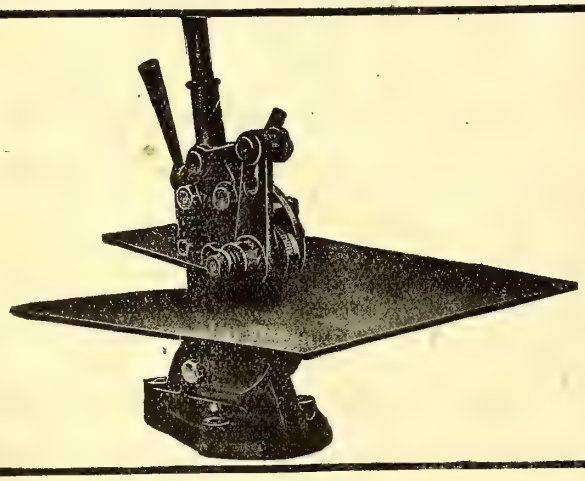
GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street, Hanover Square, W.1.



'TANGENT'

HAND
SHEET SHEARING MACHINE
PATENT.

SELF-FEEDING, FAST CUTTING.
STEEL, 3/16 / SOFTER METAL, 1/4.

Write for Descriptive Pamphlet and Prices.

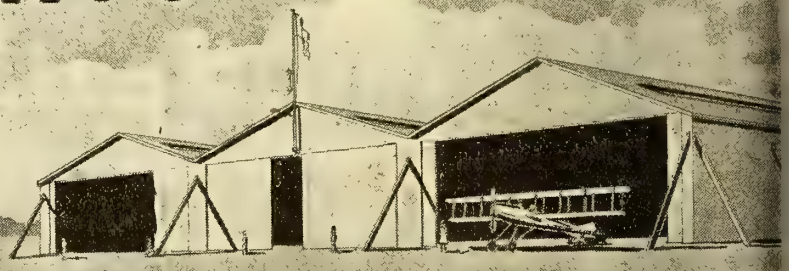
MONTGOMERY, SMITH & Co., Ltd.,
PATENTEES AND MANUFACTURERS,
TANGENT WORKS, KEYNSHAM, SOMERSET.

T.W. PALMER & Co.

ESTIMATES FREE.

MERTON ABBEY IRONWORKS
LONDON · S.W. 19

DESIGNERS MANUFACTURERS AND
ERECTORS OF EVERY DESCRIPTION OF
AIRCRAFT BUILDINGS
TEMPORARY OR PERMANENT



WORK · CARRIED · OUT · TO · OUR · OWN · OR · CUSTOMER'S · DESIGNS

CONTRACTORS TO WAR OFFICE, ADMIRALTY AND AIR BOARD.

'Phone—East 3331 (2 lines).

Wires—Dayhur, Phone London



STEEL



STAMPS



And MARKING ROLLERS for all descriptions of Aircraft Parts

Branding Irons. :: :: Stencil Plates, Inks and Brushes.

JOHN MEERLOO & SONS,

CLEVELAND WORKS, CLEVELAND STREET, MILE END, LONDON, E. 1.

HIGH-CLASS

ALUMINIUM CASTINGS

FOR ALL TRADES.

We Specialise in Aluminium Cylinders and General Aero and Motor Engine Castings,

CAST IRON CYLINDERS

Water and Air-cooled for Aero & Motor Engi es

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,

Atlas Works :: Grove Street,

BIRMINGHAM.

ALUMINIUM AND IRON FOUNDERS.

THE

Eastbourne Aviation Co. LTD.

ESTABLISHED 1911



AEROPLANE CONSTRUCTORS

Contractors to the Admiralty



TELEGRAMS: Aircraft EASTBOURNE
PHONE: 1176

AIRCRAFT DEPARTMENT



THE WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

British Metal (Kingston) Ltd

The Factory,

Kingston-on-Thames

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, DE H.
RESIDENT A.I.D. EXAMINER.

Bowden Wire Ltd:

LONDON
VICTORIA ROAD
WILLESDEN JUNCTION, N.W.10

Victoria Road, Willesden Junction, N.W.10.

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

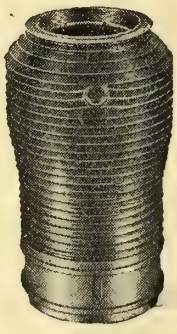
IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE AIR SERVICES.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**



THE
Beverley Engineering Works

Aeroplane Cylinders
Clerget Le Rhône Gnôme



WILLOW AVENUE, BARNES, LONDON. 'Phone: Putney 478

THE AIRCRAFT CONSTRUCTION CO.

EVERY DESCRIPTION OF METAL COMPONENTS.

Immediate Delivery of SE SUMPS.

HARLEY AEROPLANE WORKS, Beckton Rd., E. 16
Telegrams: "Aercracons," Canning, London. 'Phone: East 1300.

THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

PLYWOOD

IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

'Phone 3373 Museum.

Aircraft

National Aircraft Mfg. Co., Ltd.,
15, Drummond Crescent,
Seymour St., Euston Rd., London, N.W.1.

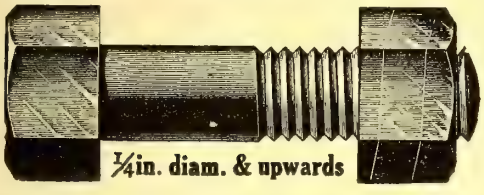
TIMBER

SILVER SPRUCE
ENGLISH ASH
WALNUT & MAHOGANY

JOSEPH OWEN & SONS
Limited
Borough Saw Mills,
LONDON, S.E.1.

Telephone: Hop 3811. Telegrams: "Busheron Bedist."

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)
QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ¼in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

Contractors to H.M. Government.

SWIFT
AVIATION CO.

Dolphin Engine Plates in Stock,
Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE—
762 KINGSTON

'GRAMS—
"SWIFT, KINGSTON"

Y.E.S. Telegrams: Y.E.S., LEEDS. Y.E.S. Telephone: 2027 CENTRAL.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'EATONIA' Process.)

Y.E.S. 'AERO' BRONZE
(Under A.I.D. Inspection.)

PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3' 6" long.

THE MOST DURABLE YET PRODUCED.

SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, LTD.,
WORTLEY, LEEDS.

Y.E.S. Y.E.S.

Berling Magneto
insures a hot, fat spark at any altitude
Worth more
Does more



Manufactured by the
Ericsson Mfg. Co.
Buffalo N.Y. U.S.A.

Aluminium Castings



Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

Contractors to H.M. Government
Chill Castings for Aeroplanes a Speciality
Telephones: 5846 City. 4879 Central.
Telegrams: Krankases, Isling, London
R. W. COAN
The Aluminium Founder
219, GOSWELL ROAD, LONDON, E.C.
COAN CASTS CLEAN CRANK CASES

STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK
J. B. GUTHRIE & SON
(JOHN J. GUTHRIE)
30, ST. MARY AXE, LONDON
TELEGRAMS—BUSIRIS LED, LONDON. E.C.3.
TELEPHONE—AVENUE 1432.

'CROID'
REGISTERED TRADE MARK
LIQUID GLUE
Adopted by H.M. Admiralty, Air Ministry, etc., for Aircraft Construction.
Sole Manufacturers:
THE IMPROVED LIQUID GLUES CO., Ltd.
Gt. Hermitage St., and Bushell St., London, E.1.
Telephone: AVENUE 1758.
Telegrams: ENCROIDEN, WAPP, LONDON.
Contractors to H.M. Government Departments.

The Air Navigation Co., Ltd.
BLERIOT & SPAD AIRCRAFT WORKS,
ADDLESTONE (SURREY).
Contractors to War Office and Admiralty.
Flying Ground — Brooklands Aerodrome.
NORBERT CHEREAU, Managing Director.
Telegrams—Bleriot, Weybridge. Telephone—352 Weybridge.

Now Ready. 1/6 *net, post free* 1/8.
THE
"Aeroplane" Blue Book 1918
A DIRECTORY OF AIRCRAFT FINANCE
By G. A.
Financial Editor of the "Aeroplane."

THE large and increasing number of Aeroplane Companies make it an urgent necessity to the many interested in the Industry to have, in a concise and handy form, a reliable Work of Reference. "The Aeroplane Blue Book" contains particulars of all the principal public Aeroplane and kindred Companies, giving:—

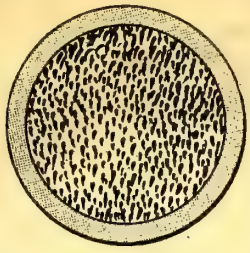
The Capital of each Company and how divided.
The Amount issued and paid up. Loans and Mortgages.
Names of Directors and other Officials.
Registered Offices. Date of Incorporation.
Profits and Dividends paid and declared.
Date of making up Annual Accounts and when submitted.
Extracts from last Balance Sheet and Directors' Reports.

THE "AEROPLANE" & GENERAL PUBLISHING Co., Ltd.
2, Breams Buildings, London, E.C.4.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS

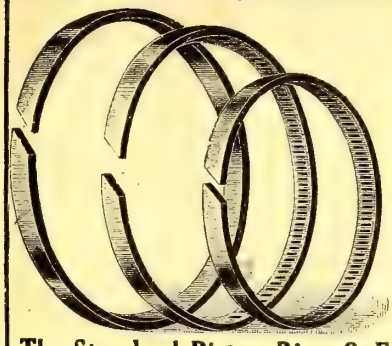
ANTOL CASE HARD



Harden your Screws and Gauges with **ANTOL.**
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1.

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices
Telephone No. 2149.
Telegrams—"Ocean," Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Premier Works, Don Road Sheffield.

THE POOLE AVIATION CO.
POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

HEATING & VENTILATING

OF AEROPLANE FACTORIES, DOPE SHOPS, AERODROMES, ETC., IS A SPECIALITY WITH US.

'PHONE: HOP 372.

HEATING

WE HAVE EXPERIENCED MEN TO OFFER PERSONAL ADVICE AND ALL SCHEMES AND ESTIMATES ARE FREE.

CHAS. P. KINNELL & CO., Ltd.
SOUTHWARK STREET, LONDON, S.E. 1.

REPETITION WORK in large quantities.

WAR SERVICE ONLY

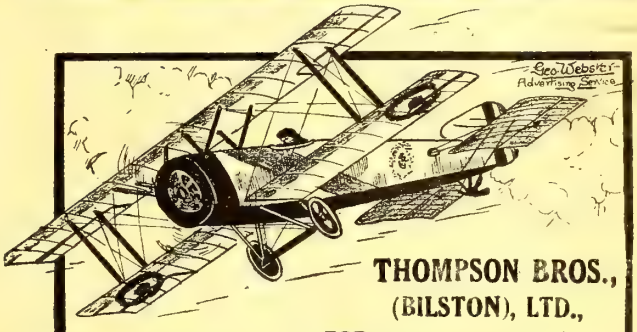
SMALL

PRESSINGS

STAMPINGS
AND
BENT WIRE GOODS

SEND US YOUR ENQUIRIES

SMITH AND DAVIS, LIMITED.
Stampers and Piercers,
HAMPTON STREET, BIRMINGHAM.



THOMPSON BROS.,
(BILSTON), LTD.,
— FOR —
UNDERCARRIAGES
TUBULAR FRAMEWORK
AERO. DEPT. BILSTON, Staffs.

Aeroplane Steel Sheets

as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.
IRON AND STEEL WAREHOUSE
SMETHWICK, BIRMINGHAM
Telegraphic Address: "Bernico," Birmingham. Telephone No.: 324 Smethwick.

The **Best** **Piston Rings**



Scientifically designed. Made from high tensile cast iron and hammered to give an even radial distribution of pressure. Gastight. Sizes up to 90 in. diam.

The **BRITISH CHUCK & PISTON RING CO. LTD.**
Holbrook Lane, **COVENTRY.**

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Phone: Putney 787. Established 1912.
ROPOR'S
Aeroplane and General Sheet Metal Works.
COWLS, TANKS, UNDERSHIELDS, FAIRINGS.
Hammered Work in all Metals.
Experimental and Special Work Undertaken.
347a, New Kings Road, Fulham, London, S.W.6.

AEROPLANE STAMPINGS
IN 3 PLYWOOD.
Perfect cutting. Sample posted free.
SMALL PARTS UP TO 12 ins. by 4 ins.
A. W. ROSS, 20, HERTFORD RD., KINGSLAND RD., LONDON, N.1

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

NAME PLATES.
WE SPECIALISE IN EVERY DESCRIPTION OF NAME PLATES IN METAL, .VORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

ALWIN ENGINEERING CO., AERONAUTICAL ENGINEERS.
A. E. CARTLIDGE. LUTHER ROAD, TEDDINGTON, S.W.
Tel. No. Kingston 2412.
TRADE MARK ALWIN
Makers of all kinds of Aircraft Fittings.
Presswork a Speciality,
Pressings for DeH, etc
Avro, Sopwith, Fairey and many other types
On receipt of Post Card our Representative will call and give immediate quotation.

Springs! Springs! Springs!
We make a speciality of
Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

SYSTEMS at RACING & ROULETTE
A book of absorbing interest to all System lovers, showing how a regular and substantial income can be earned with small capital.
Price—THREE PENNY STAMPS.
SIMPLEX PUBLISHING, 1, NEW OXFORD STREET, LONDON, W.C.

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

P.D.V. Aircraft Company, Ltd
All Metal Parts for Aircraft made, comprising th following machine work: **Milling, Turning Shaping, Press Work, Slotting, Drilling, Grinding an Sheet Metal Work.** Well-equipped Welding and Brazing Plan
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices & Works: **Princes Street, Richmond, Surrey.**
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING
RUSSELL BROTHERS, Ltd., REDDITCH
MACHINES.

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

CIAL PREPAID RATE: 18 words 1 6; Situations Wanted ONLY, 18 words 1 -; 1d. per word after. TRADE ADVERTISEMENTS in these columns, 3 lines 3 -; 10d. per line after. Public Announcements, Legal Notices, Auctions, Contracts, etc., 1 6 per line For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1

PATENTS.

E & ROWLINSON, Chartered Patent
its (Consulting Engineer, Mr. S. E.
, A.M.Inst.C.E.), 27, Chancery Lane,
on, W.C. Tel. 332 Central.

y Skerrett, Chartered Patent Agent, 24,
ple Row, Birmingham.—Patents, trade
s, and designs.

SITUATIONS VACANT.

rge Firm, London, N.W., has several
cies for aeroplane erectors and assem-
used to accurate and high-class aero-
work. No one living more than 10
away or engaged on Government work
write to Box 3360, THE AEROPLANE, 166,
lilly, W.1.

ge London firm connected with aviation
a vacancy for a first-class **Outdoor**
sentative who must be exempt from
ry service. Invalided flying officer will
given preference.—"Representative,"
on's Advertising Agency, 52, Shaftes-
Avenue, W.1.

ed by a large London Aircraft En-
ing works a number of good **Mechanical**
ghtsmen—men with previous aero-
al experience preferred. Write stating
experience and salary required. No
ill be engaged who resides more than
les away or who is on Government
—Write Box 263, Sells, Ltd., 168,
Street, E.C.4.

ge number of Fitters with experience of
ft work are required for London
ane factory. Full rate and war bonus.
e living more than 10 miles away or
vernment work will be engaged.—Write
No. 268, Sells, Ltd., 168, Fleet Street,

ghtsmen and Assistant Draughtsmen re-
on aeroplane work; good mechanical
ence essential. No one on Government
need apply.—Applications must be made
gh your nearest Employment Exchange,
oning this paper and No. 3457.

CRAFT WORKS, LONDON.

Purchasing Department.

itions are invited for the post of head of
sing department in a large aeroplane
cturing firm. Applicants must have had
mmercial experience in the purchase of
rs' materials and tools, and in sub-con-
work. Full details must be sent to ex-
e and previous positions held. Age and
required must be stated. All such de-
ill be treated in strict confidence. No
ll be engaged who is on Government
r resident more than ten miles away.—
Box 3490, THE AEROPLANE, 166, Picca-
V.1.

Works, London, N.W.—Man wanted
complete charge of steel stores. Know-
f decimal and millimetre sizes essential.
experienced man to take charge of
wood part stores. No one need apply
es more than 10 miles away or who is
ernment work.—Write, Box 283, Sells,
8, Fleet Street, E.C.4.

r, experienced, required for control and
endence of works making propellers
craft spares—Controlled. Must have had
experience. No one on Government
ill be engaged.—Apply, with full par-
, stating age, salary required, etc., to
arest Employment Exchange, mention-
paper and No. 532.

Aeroplane Factory Progress Department.—Engineer required, capable of taking charge of progress department of large aeroplane manufactory works (London). He must have had a thorough engineering works training, be well acquainted with modern methods of production, and be very systematic in his books. He will be directly responsible to the superintendent of the factory, and have entire control of the progress staff in the various departments. A good salary will be paid to a capable man. Apply, stating age and salary required, and giving full particulars of past experience, positions held, and when free to commence. No one need apply who is living more than 10 miles away or engaged on Government work.—Write, Box No. 3487, THE AEROPLANE, 166, Piccadilly, W.1.

RADIATOR AND SHEET METAL WORK
UNION WORKMEN
(BEST RATES PAID)
WANTED
No one already on Government work, or resident more than ten miles away will be engaged.
Apply—
GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.3

SITUATIONS VACANT.
AERO ENGINE WORKERS WANTED
(BEST RATES PAID.)
TOOLSETTERS, TURNERS, MILLERS AND FITTERS.
No one on Government work or resident more than 10 miles away will be engaged
APPLY—
GILLETT, STEPHEN & CO., LTD.
BOOKHAM, SURREY.

Experienced Man wanted to take charge of receiving department in large aeroplane factory stores. Applicants must be conversant with stores routine, and the handling of large quantities of goods expeditiously. No one will be engaged who lives more than 10 miles from London, N.W., or who is on Government work.—Write, Box 284, Sells, Ltd., 168, Fleet Street, E.C.4.

Required at once, Progress Man. Good wages and conditions, preferably technical man and one used to aircraft. One hour from London. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3511.

Advertiser has small machine shop, 5 lathes, miller, slotter, etc., and new well-built premises, and desires to use same for aircraft work. Good **Aircraft Mechanic** required to work same as Partner or Manager. State qualifications.—Box No. 3510, THE AEROPLANE, 166, Piccadilly, W.1.

Draughtsmen and Tracers (Ladies) wanted immediately for aircraft work. No one on Government work will be engaged.—Apply, stating experience to May, Harden & May, Ltd., Hythe, Hants.

Wanted, a Rate Fixer in the Midlands. Knowledge of wood work would be an advantage, but not essential. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3508.

Wanted, Jig and Tool Draughtsman for large aircraft works in the Midlands. Experience in aeroplane work an advantage, but not essential. No one on Government work will be engaged.—Applications must be through your nearest Employment Exchange, mentioning this paper and No. 3507.

Draughtsmen, mechanical, wanted immediately for Controlled Establishment. No one on Government work or living more than 10 miles away need apply.—Write, stating age, experience and salary required to General Motors (Europe), Ltd., Old Oak Lane, Willesden Junction, N.W.10.

Good Foreman for Capstan Lathe Section, must be first class operator. Also **Foreman** for Fitting Section. Applicants must have had experience in internal combustion engine erecting and be capable supervisors. State experience and salary required. No one on Government work eligible.—Apply at your nearest Employment Exhange, quoting No. A5040.

Wanted, Forewoman, capable of taking charge of 100 girl fitters. Must be thoroughly up in reading working drawings and able to instruct girls in the use of their tools. Good disciplinarian. Good pay for the right person. No one on Government work will be engaged. —Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3503.

Cost and Invoice Clerks required, male and female, for aeroplane Factory, London District. Preferably with aeroplane or Engineering costing experience. No person resident more than 10 miles away or already on Government work need apply.—Reply, stating age, particulars of qualifications, and salary required, to Box No. 3501, THE AEROPLANE, 166, Piccadilly, W.1.

Required, good Man to take charge of Costing and Stock record office in large aeroplane factory, London district. Previous experience of aeroplane or engineering costing essential. Good salary to right man. No one resident more than 10 miles away or already on Government work need apply.—Reply, stating age, full particulars of qualifications to Box No. 3502, THE AEROPLANE, 166, Piccadilly, W.1.

Estimators (1 Maching and 1 Fitting) required in Planning Department of firm manufacturing aero engines in the West of England. Only first class men need apply. Good position for suitable men. No one already on Government work will be engaged.—Apply, stating age, experience, salary required, and position as regards Military Service to your nearest Employment Exchange, mentioning this paper and No. 3497.

Engine Mechanics wanted immediately for a large new aircraft factory on the South Coast. Must be first class men, thoroughly used to overhauling tuning, testing and fitting into machines 100 h.-p. Mono Gnomes. No one on Government work will be engaged.—Give fullest particulars of qualifications and salary required to your nearest Employment Exchange, mentioning this paper and No. 3499.

SITUATIONS VACANT—continued.

Aeroplane Main Assemblers—experienced men required, Tottenham district, knowledge of H.P. machine advantage. No person already on Government work or residing more than 10 miles away need apply.—Box No. 3500, The Aeroplane, 166, Piccadilly, W.1.

Wanted as Foreman, first class Fitter and Turner, experienced in Aircraft Metal Work, Coppersmith and Acetylene Welding; good oragniser and strict disciplinarian. No one on Government work will be engaged. State age, experience, and salary required to your nearest Employment Exchange, mentioning this paper and No. 3506.

Wanted, two skilled Setters-up for machine shop. Must be able to set up Centre Lathes, Capstan Lathes, Drilling and Milling machines. None but the most experienced men need apply. Those on Government work will not be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3504.

Fitter Erectors (final erection) and engine fitter-erectors required for De H. 9 machines. No one residing more than 10 miles away or engaged on Government work need apply.—Ruffy, Arnell, and Baumann Aviation Co., Ltd., Noel Road, Acton, W.3.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, The Aeroplane, 166, Piccadilly, W.1.

Efficiency Engineer seeks berth as Chief Inspector; first class practical experience on aero engines and machine tools; good technical knowledge; tactful; energetic; good organiser.—Box No. 3509, The Aeroplane, 166, Piccadilly, W.1.

Junior Aeroplane Draughtsman desires appointment in Government Department or on Government work. Eighteen months' experience in Aircraft Drawing Office. Age 23. Grade 3.—Slay, 10, Wellington Square, Oxford.

Works Manager (aircraft) disengaged, requires similar position. A good practical man and excellent organiser. Moderate salary and commission on production.—Box No. 3505, The Aeroplane, 166, Piccadilly, W.1.

Charge Hand—Dope and Covering Departments; experienced Land and Seaplanes; good organiser.—L.B., 27, Seymour Road, Hornsey, N.

General or Mill Foreman. Eight years' aircraft experience in responsible positions, aero and seaplanes. Capable organiser, used to decimal and metric system, cost of production brought to minimum by advanced methods and practical knowledge of detail; keen estimator; expert knowledge of economical conversion and values of timber. Age 39.—Box No. 3498, The Aeroplane, 166, Piccadilly W.1.

Foreman of Aircraft Woodwork and Assembly desires engagement. Good organiser and disciplinarian. Modern methods with tactful control of labour.—Box No. 3516, The Aeroplane, 166, Piccadilly, W.1.

Woodworking Machinist Foreman now at liberty; thorough practical mechanical knowledge of Sawmill routine, and rapid production. Used to aircraft, propellers, general high class woodwork to fine limits, and economical conversion of timber.—Box No. 3514, The Aeroplane, 166, Piccadilly, W.1.

Buyer-Advertiser (Grade 3, 24) seeks position as assistant buyer or progress clerk; seven years' experience in buying department of metal and hardware exporters; capable and intelligent. London district preferred.—Box No. 3513, The Aeroplane, 166, Piccadilly, W.1.

The Services of a Gentleman with exceptional opportunities are at the command of any firm desirous of extending their interests in the aeronautical world. — Write Box 552, c/o Hooper & Batty, Ltd., 15, Walbrook, E.C.4.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1

Wanted, aircraft wood work. First-class work in any parts, well equipped, prompt attention, experience in making and assembling.—State full particulars to Box No. 3486, The Aeroplane, 166, Piccadilly, W.1.

Rubber Twill Cuttings, in any quantity. State average size, quantity and price required, to Aylen, 38, Sun Street, London, E.C.2.

Contracts wanted for woodworking, light forging, electro-plating (also aero engine parts) by old established firm (largest in their line in world) with most up-to-date woodworking plant in Yorkshire. Able to guarantee accurate work.—Simpson Fawcetts, Hunslet, Leeds.

Cowls and all kinds of Sheetmetal work for Aircraft wanted by London firm.—Box No. 3515, The Aeroplane, 166, Piccadilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page IV. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264 or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester

We undertake Contracts for light engineering work. Ask for quotation.—R. L. Dubois & Co., Aeronautical Engineers and Manufacturers, 673, Romford Road, Manor Park, E.12.

Immediate Deliveries of metal fittings, light presswork, etc. Good workmanship; prompt deliveries.—Box No. 3512, The Aeroplane, 166, Piccadilly, W.1.

MODELS.

T. W. K. Clarke and Co., Ltd., Model Department, Hampton Wick.—Though we are full up with full-size aeroplane parts orders, we still build models as we did in 1906. Sopwith Biplanes, etc., in Stock.—Send 3 stamps for our illustrated List, 120 items and 14 models; certain metal goods are out of stock.

FOR SALE

Tarpaulins.—Waterproof khaki sheets for sale; also few second-hand railway truck tarpaulins; London works.—For prices and particulars write Johnston, 12, Broughton Road,

For Sale, quantity 2½ x 10 wire nails. Offers wanted.—Apply Box No. 3496, The Aeroplane, 166, Piccadilly, W.1.

For Sale, about 100 ft. Shafting, 3in. diameter, complete with couplings, roller bearings, and several pulleys. Planing Knife, Grinding Machine, Screwdriving and Boring Machine. All in splendid condition.—Apply Box No. 3517, The Aeroplane, 166, Piccadilly, W.1.

ENGINEERING.

British School of Aeronautics. — Air Engineering Course; Aero Design; Aero struction; Aero Draughtsmanship; Mecha Engineering. — Pennington's, 254, O Road, Manchester.

AVIATION

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Eng in Aeronautics. Demonstrations from plete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTIT LTD.,

21a, Loudoun Road, St. John's Wood, N

MISCELLANEOUS.

MAKE MONEY BY WRITING

£50 PRIZE. Send postage (2d.) for ticulars and copy of "How to Earn M while Learning How to write for Newsp and Magazines." Practical and Co hensive Correspondence Courses—Fictio Articles, etc. Expert Literary Dire Constructive Criticism. Beginners t how to make work saleable. Excep testimonials. Address "Editorial" (E.M.), 22, Chancery Lane, London, W

TO LET FURNISHED.

Edgware.—A convenient house suitab staff working at aerodrome and fact Hendon; 2 reception rooms, 3 bedroo dressing room, bathroom, kitchen, etc. garden front and back; 2 guineas per w Reply, Robinson, 4, Oakley Square, N.

AUCTION.

TO AEROPLANE MANUFACTUI CONTRACTORS AND OTHER STROOD, ROCHESTER, KENT

Messrs. Prall & Prall will Sell by Auct the Bull Hotel, Rochester, on Tuesday, 23rd, 1918, at five o'clock,

VALUABLE FREEHOLD PREMIS situate at Cuxton Road, Strood, cover ground area of 11,300 square feet, and with Mill, with 12-h.p. Stockport Gas E and all necessary woodworking mach which is included in the sale. Stores, drying rooms, etc., also valuable Fr Contractor's Yard, situated close to the and comprising an area of 1a. 2r. 13p. stabling, blacksmith's shop, etc. A fo Hand Crane, and about 1,000 tons of B Fall Stone and Granite Curb are inclu the Sale. Possession of both properti completion of the purchase. Partic Plans, and Conditions of Sale of M Arnold, Day & Tuff, Solicitors, Roch Messrs. Corbould, Ellis & Mitchell, Soli 1, Church Court, Clement's Lane, Lo Street, London, E.C., and of the Auctio Messrs. Prall & Prall, 150, Eas Rochester, Kent, Chatham 448.

PUBLICATIONS.

BOOKS

By Lieut. Victor W. Page of the U.S. Air Se

JUST PUBLISHED.

AVIATION ENGINES. Their Design, Co tion, Operation, and Repair. A book for the S Engineer, and all interested in Aviation, by a r ised authority. Giving practical instruction or and maintenance not to be found else Medium 8vo. 580 pages, with over 240 ve tinctive and specially made Engravings. Price Ne

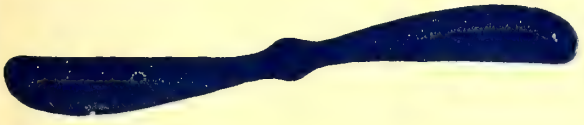
GLOSSARY OF AVIATION TERM English-French and French-English. Cro 100 pages, with Plates and Illustrations. Price N

AN AVIATION CHART. A large Wall showing a typical Aeroplane Power Plant Section, with all important components Folding to Pocket Size. Price Net 2

London: CROSBY LOCKWOOD & 7 Stationers' Hall Court, E.C.4

CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone Kingsbury 104.

OXY-ACETYLENE
WELDING & CUTTING
PLANT

The Latest and Best Type of Plant for this Process as installe by the leading Aircraft, Shipbuilding and Engineering Firms, H.M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C. ATOZ G.B.

Carbide. Flarelights, Handlamps.
Petrol and Oil Storage Drums of any capacity. Steel Barrels, Sheet Metal Work for Aircraft, etc.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "Flamma, Vic, London." Telephone: Victoria 4830.

ACCURACY

J. H. ROBERTSON & Co

AERONAUTICAL ENGINEERS

Tel. REGENT 3996 LONDON OFFICE: 1, ALBEMARLE STREET, W.1

All classes of machining. *FINE LIMIT WORK.*

JIGS, GAUGES, AND SPECIAL TOOLS.
TURNBUCKLES, EYEBOLTS A.G.S. SPECIFICATION.
STAMPINGS, AND HIGH-CLASS STEEL FORGINGS, PRESS WORK, &c.
OVERHAULING AND REPAIRS TO ALL TYPES OF AERO MOTORS.
PROPELLERS FOR ALL TYPES OF AIRCRAFT.

CRANKSHAFTS, PISTONS, GUDGEON PINS, VALVES A SPECIALITY.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams: "*Airengine, London*" *Telephones: Gerrara* 8165; *Richmond* 1293.



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W.1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passage, London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. Gorey

WEDNESDAY, APRIL 24 1918.

Vol. XIV. No. 17 THREEPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

THE NORMAN THOMPSON FLIGHT CO. Ltd.

ESTABLISHED 1909

Telegrams—SOARING, BOGNOR
ENTIFLYTE CHARLES, LONDON

Works—MIDDLETON, BOGNOR

CONTRACTORS TO THE ADMIRALTY

Telephone—BOGNOR 48. GERRARD 7385

London Office—
DEWAR HOUSE, 11, HAYMARKET, S.W.1.

DESIGNERS AND MANUFACTURERS OF FLYING BOATS AND LAND PLANES

Auster FOR **Aero-shields**

LONDON. BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE

NON-POISONOUS

DOPE

SEE ADVERT: INSIDE.

TELEPHONE: OLDBURY 111. **ACCLES & POLLOCK, LIMITED.** TELEGRAMS:- ACCLES OLDBURY

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.

TRIPLEX SAFETY GLASS

The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

THE
Engineering Timber Co., LTD.

Beg to advise their Northern customers that they have now established a Branch

AT

CUNARD BUILDINGS, LIVERPOOL.

Telephone: BANK 3944. **Telegrams: ENTIKOSIL, LIVERPOOL.**



EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT



AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren, Piccy, London."
" Phone—280 Gerrard

Works

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

GNÔME & LE RHONE ENGINE COMPANY

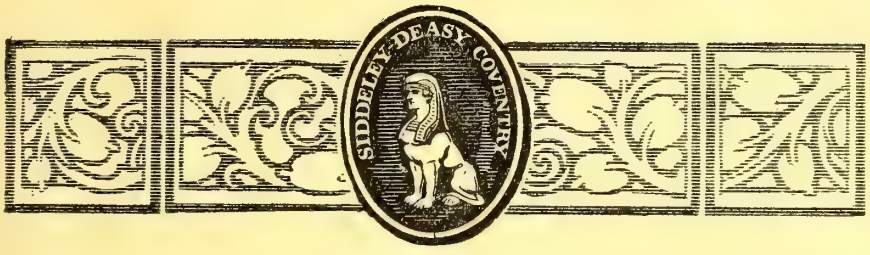
Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Works: Blackhorse Lane, Walthamstow.



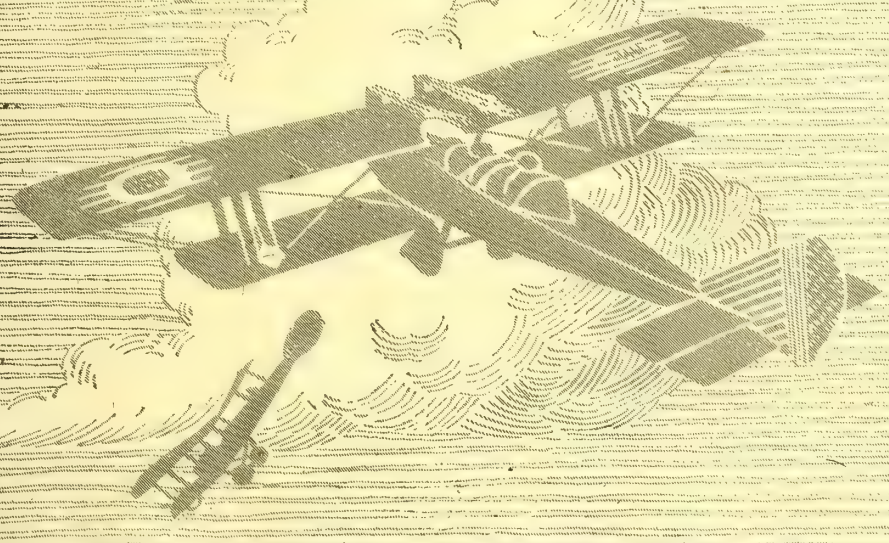
FOR more than three years the entire Siddeley-Deasy organisation and resources have been devoted to the service of the nation. In that period—and in that service—a position of absolute supremacy has been achieved.

The SIDDELEY-DEASY MOTOR-CAR Co., Ltd., COVENTRY. *Contractors to H.M. Air Ministry; Designers & Constructors of Aero Engines, Aeroplanes & Luxurious Motor Carriages*




WHITEHEAD
AIRCRAFT
RICHMOND
SURREY

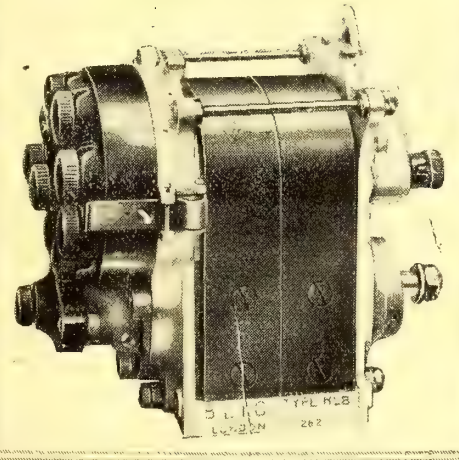
ASSOCIATION OF BRITISH MOTOR AND ALLIED MANUFACTURERS



THE HEART OF THE AEROPLANE—the vital centre of its power unit—is undoubtedly the magneto. Failure there must be unthinkable! That is why the "B.L.I.C." Magneto is supreme—its absolute reliability may be taken for granted!

B·L·I·C

THE BRITISH LIGHTING & IGNITION Co. LTD.



THE BRITISH LIGHTING AND IGNITION Co., Ld.

204, Tottenham Court Road, London, W.1.
Proprietors: VICKERS Ld.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

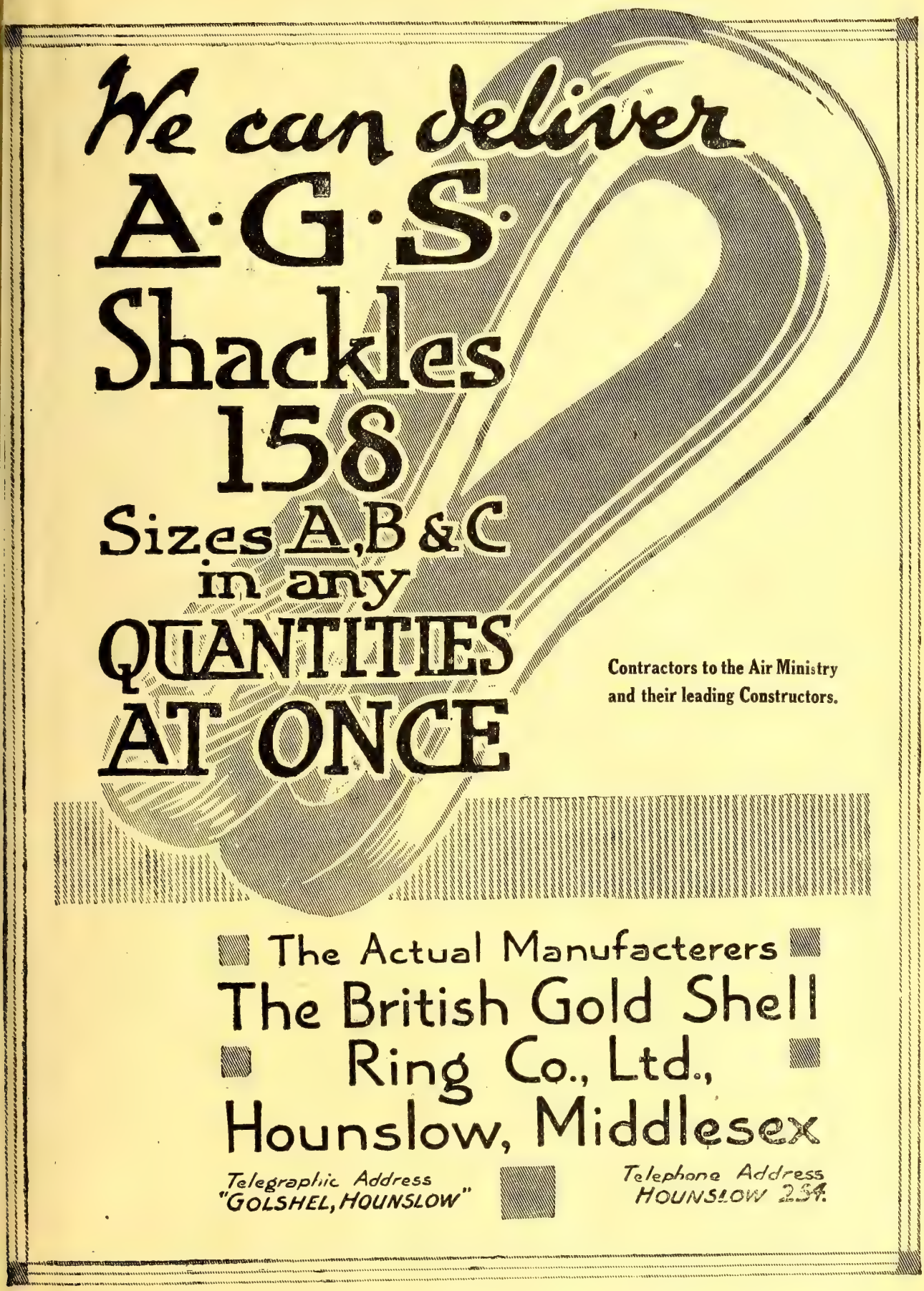
UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.


We can deliver
A·G·S·
Shackles
158
Sizes A, B & C
in any
QUANTITIES
AT ONCE
Contractors to the Air Ministry
and their leading Constructors.
The Actual Manufacterers
The British Gold Shell
Ring Co., Ltd.,
Hounslow, Middlesex
Telegraphic Address
"GOLSHEL, HOUNSLOW"
Telephone Address
HOUNSLOW 254.

A. V. ROE & Co., Ltd.

Aeroplane Constructors.

NEWTON HEATH
MANCHESTER.

Telephones—
City 8530 and 8531.

Telegrams—Triplane.



AEROPLANES

AND

PARTS.

HAMBLE,
near SOUTHAMPTON.

Telephone—
Hamble 18.

Telegrams—
Roe, Hamble.



166, PICCADILLY,
LONDON, W.1.

Telephone—
Gerrard 3186.

Telegrams—
Senalpirt, Phone.

CODE: A.B.C.: 5th Edition.

APRIL 24, 1918 VOL. XIV. NO. 17

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London, W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON THE COMMAND OF THE ROYAL AIR FORCE

Some idea of the deep and widespread anger felt by all who are concerned with Service Aviation over the removal of Major-General Sir Hugh Trenchard may be gathered from the way in which the affair has been taken up by Members of Parliament and by the "Morning Post," which is to-day—so far as one can discover—the only daily paper which is not under the thumb of either this dire Government or of the Asquith clique.

It is true that General Trenchard resigned, and was not technically dismissed, therefore one writes advisedly of his "removal." It may be, however, that his resignation was a sound piece of strategy. Sir Hugh Trenchard is recognised by all the best authorities, especially abroad, as one of the great soldiers of this war.

We have recently seen the result of Field-Marshal von Hindenburg's voluntary withdrawal from the Somme to the St. Quentin line early in 1917, which entirely spoiled our "Spring Push," and allowed him so to organise his forces that his return has gained for him more ground than he lost. If von Hindenburg had held to his old Somme line he would have been gradually badgered and beaten into impotence long before he was ready for his great offensive. Perhaps this may be an omen of General Trenchard's return, but, all will hope, with the great final difference that, whereas von Hindenburg must suffer defeat on his reconquered territory, Sir Hugh Trenchard will return to command the King's Flying Service in its final victory.

If General Trenchard had been a smaller man he would have hung onto office as long as he could. As a result he would have become the butt of Government-inspired newspapers. And after a sufficient period the attacks by the jackals of the press would have weakened his position so that he would have retired, weakened and beaten, just as other good soldiers have retired through similar causes.

As it is, he has done absolutely the right thing. He has retired in such a way that he cannot be attacked, and so that he is in a stronger position than even he has ever been before. The newspapers dare not attack him, for if they did their game would be too ridiculously obvious and they would merely defeat themselves while increasing his already great prestige. Thus he has apparently spoiled Lord Rothermere's Spring Push.

General Trenchard is not a political soldier; he is one thing and one only—a great general of fighting men. He is the last man in the world to wish to attract attention as the subject of a public discussion. The fact that his removal has caused such an outburst of anger is at once testimony to the immense influence which he has acquired by his work in the field, in spite of his self-effacement so far as concerns the mere vulgar public, and to the soundness at heart of the British people, who still have the ability to recognise a great man when one is vouchsafed unto them.

Therefore one is justified in saying that his position to-day is stronger than it has ever been. When the proper time comes for him to return, Heaven help those who stand in his way!

The Proper Position.

The obviously proper position for General Trenchard to occupy is that of Commander-in-Chief of the Royal Air Force, after all the Naval side has been handed back to the Navy where it belongs. The position of Chief of the Air Staff is not big enough for a soldier of his calibre.

After all, the C.A.S. is merely a member of a Committee, dignified perhaps by being called the Air Council. We in this country are being ruined through government by committees. Now, as ever in the world's history, the ideal form of government is a benevolent despotism. If ever a Service needed a despot to run it properly the R.A.F. is that Service. And the peculiar fitness of General Trenchard to fill the part of the benevolent despot is almost too obvious to need indicating.

Benevolent despots throughout history have deputed the duties of attending to the details of their organisation to an astute Vizier, or Chief of Staff. It seems quite possible that General Sykes, who is undoubtedly a very able organiser, would precisely fit that particular office. One is perfectly ignorant as to whether General Trenchard would find the same difficulty in working with General Sykes as that which General Henderson gave officially as his reason for resigning from the Air Council. Like Mr. Balfour on another subject, one is a child in these matters. But, if only such an arrangement could be made to work, one can imagine nothing more likely to lead to the highest efficiency in aerial warfare than that General Trenchard should be appointed C.-in-C. R.A.F. with full powers, and that General Sykes should be his right-hand man.

Thus one would have a great strategist and tactician, who is also one of the greatest leaders of men whom this country has ever produced, in absolute command of our Air Power, with an exceedingly clever organiser and handler of detail work as his Chief of Staff. Which is not in the least to say that General Trenchard is not a clever organiser, or that he is weak on detail. Far from it. But his outstanding qualities as a leader and as a general of fighting men obviously make it more desirable that his whole energy should be directed towards the higher and larger questions of air war, and to maintaining and increasing the *moral* of his men, than that he should bother himself with the details of organisation and administration, the very work in which General Sykes particularly shines.

Outside Opinions.

One has been accused from time to time of making this paper the organ of one's personal opinions. Nothing is further from the truth, for whatever ideas, theories, or opinions are herein set forth are invariably the collected and condensed views of many others, all

of whom are well qualified to hold such views. In this particular instance it seems well to quote at length some outside opinions, expressed by men of experience. Here is one notable example of the feeling which exists regarding the Government's treatment of the King's most loyal servants :—

Lieut.-Col. A'Court Repington, C.M.G., a soldier of great active-service experience, formerly editor of that brilliant official publication, "The Army Review," and until recently the military correspondent to the "Times," writing in the "Morning Post" on April 17th says :—

Mr. Lloyd George has misled the House of Commons, as he has the country in almost every statement that he has made about the war since we had the misfortune to entrust him with the direction of it. War has found him out. It is a sterner and harsher taskmaster than the Lobby.

The whole object of Mr. Lloyd George, in his Paris speech as on April 9th, was to divert his responsibility upon the soldiers. His is a mean and an un-English attitude and frame of mind. He has never known how to treat soldiers or sailors, and the difference between his shabby behaviour towards them and the generous terms in which great men like Chatham and Sidney Herbert always referred to generals in the field is just all the difference in the world.

Mr. Lloyd George understands nothing about war. No Prime Minister of England in a great war has ever been so disastrously *mal entouré*. All the servile, superficial, and unbalanced minds of politics and the Press have been his bane.

Press proprietors and editors, with a few honourable exceptions, have grovelled at his feet. He has not sought for truth but for obsequiousness and servility. He has always preferred the military advice of some young booby in uniform—provided he were not over the rank of lieutenant—to the reasoned advice of the late General Staff, which was the best in Europe and impeccably honest.

He gets rid of Jellicoe and Robertson, and now allows Lord Rothermere to get rid of Sir Hugh Trenchard, one of our few indispensable men, and goes his own way rejoicing with his kindred spirits.

He has chosen to assume the mantle of Chatham, and has been crushed under its weight. He has attempted to conduct the war without understanding its elements or first principles. With the blood and tears of England his errors are expiated by those innocent of fault.

In the same issue of the "Morning Post" one of those able and honest men who set forth in its leading articles the sanest and most truly patriotic views on the conduct of the war which are to be found in any daily paper says :—

It is impossible not to regret that Lord Rothermere, being so keenly alive to the urgency of providing this real stragetic staff, should, as a first step towards it, have accepted the resignation of a soldier of such distinction as Major-General Sir Hugh Trenchard. In the Flying Service Sir Hugh Trenchard's is perhaps the most outstanding name, and as chief of the fighting organisation in France his services were brilliant.

By general consent his appointment as Chief of the Air Staff was recognised as the fittest that could have been made. Yet suddenly we are informed that Sir Hugh Trenchard has resigned, because "he took a view as to the powers and duties of the Chief of the Air Staff which the Secretary of State of the Royal Air Force could not accept."

With all respect to Lord Rothermere, it is no sufficient compensation to know that he remains Secretary of State, though Sir Hugh Trenchard is no longer Chief of the Air Staff.

Yet a third opinion from a letter published in the "Morning Post" of April 20th deserves to be quoted. The name and position of the writer is not made known, but from internal evidence it is clear that he is closely in touch with the R.F.C. This letter says :—

In this war we have taken the initiative little enough, in fact only in the air have we led all the way. At the battle of the Somme our great air offensive—Trenchard's offensive—beat the Hun, and kept him on the other side while we harassed his troops, transport, and commnuications with machine-gun fire and bombs. His artillery machines were unable to work freely, ours worked all day.

Twice since then the enemy has gone "all out" and for a time contested the right of way—but only for a time. Our production was too sure, our men too good and well trained, and our *moral* too great. Again, the great noble Chieftain Trenchard had foreseen all, and with his whole-hearted energy, great brain, and wonderful personality was prepared to meet this endeavour of the enemy and beat it. To-day, when more than ever before, the Hun wishes for air supremacy to help in his great final effort to overthrow the British Empire and the Allies, he can do nothing, he is more at our airmen's mercy than ever before.

Thousands of his troops die, his preparations for attacks are often broken, and his supplies stopped, and this because the British Empire had in Trenchard a really great, far-sighted, and strong soldier: I say unhesitatingly one of the greatest soldiers that England has to-day. He had the absolute confidence of all the R.F.C.—he inspired them. He held the trust and confidence of the R.N.A.S. and their respect, and more still our noble French Allies honoured, trusted, and loved him for his greatness, his success, and his absolute sureness.

In the air we have made no mistakes; the Allies and the enemy will both acknowledge this as a fact. It is the one Service where England has led all the way. And now, at a time like this, the great Chieftain goes.

Does he go of his own accord? No, his great heart was too wrapped up in his work, so much so that the people of England knew and heard little of the man who made us masters of the air and saved how many thousands of their sons upon the ground.

Then why does he go? We want to know, and we must know. Who is Rothermere? What has he done for the British Empire as far as the war in the air is concerned? He is not a proved man.

People of England, you have a proved man, a man who is yours heart and soul, a great soldier and a great leader and organiser—are you going to let him go without a word? His successor is perhaps a great man, but is he a proved man as far as the Air Service is concerned? It were better that he had never come, and that Rothermere left than that Trenchard went.

This is no time for change or for experiments. Under the new *régime* some things *may* be better, but this is not a time to risk their being worse. All men have confidence in Trenchard. Will they have equal confidence in the "new man"?

Confidence is essential, that we know. Too many lives, too many of your sons' lives, oh Mother Country, are at stake. Trenchard in all his work has always considered the cost, and always a life given to-day has meant lives saved to-morrow.

The Inner Reason.

That letter reads as if it came straight from the R.F.C. itself. In the last sentence you have the inner reason for the confidence which the Corps has in its great leader. "Always a life given to-day has meant lives saved to-morrow."

Only great men achieve the honour of nicknames. To the R.F.C. Sir Hugh Trenchard is known universally as "Boom." Obviously it is not for his love of advertising himself, for until Lord Rothermere's unfortunate "Spring Push" he was less known outside military circles than any of the young Hun-killers to whom he had awarded decorations, and whose unrecognisable photographs appeared in the cheaper news-prints accordingly. The name is, in fact, used as a mingled expression of affection and respect, as one might give a similar nickname to a very effective piece of heavy artillery, and no more implies disrespect than did the name "Dizzie" as applied to the late Lord Beaconsfield by all loyal Conservatives, or "The Grand Old Man" as applied to the late Mr. Gladstone by his party. General Trenchard was given the name as a Major, at the Central Flying School, on account of his deep voice and the general impression he gave of bigness—an impression well confirmed on active service—and the name is now fixed among all Service aviators.

One mentions this partly in order to explain the hold which he has over his men, and partly to make understandable a phrase which indicates how great is that hold. Not very long ago a gallant young squadron-commander R.F.C. was discussing the *moral* of his pilots and the happy condition of the Corps in general on active service, and remarked, "My people will do pretty well anything I want them to do, but if 'Boom' asked them to fly over the mouth of Hell on box-kites they'ld do it without a murmur. They'ld probably say, 'We don't know what his game is, but if Boom wants it done we suppose it's all right.' And off they'ld go."

Under it all was the feeling that a life given to-day meant lives saved thereafter.

The Personal Touch.

Another incident, told by one of the squadron concerned, illustrates General Trenchard's personal influence. At the time of the Somme Battle in 1916, a certain squadron had lost heavily. All its best men had been shot down, or had disappeared in Hun-land. The places of the casualties had been filled up by new pilots fresh from home, without fighting experience, and they had perforce to be pitched into the thick of the battle. The *moral* of the squadron went to pieces, and pilots took to coming back before crossing the lines, complaining of "dud engines"—and other more or less imaginary troubles.

The local C.O. was in despair, and reported the state of affairs to Headquarters. Soon afterwards General Trenchard appeared at the aerodrome. He went round and inspected the sheds, chatted with the pilots about their machines, armament, and so forth, but never said a word about the trouble which they all knew had brought him there. Then he lunched in the mess, and the pilots and observers felt very uncomfortable, expecting a lecture afterwards.

When lunch was over he got up and walked towards the door. As he reached it he turned round, looked them all over slowly as they stood by their tables, and said in his short gruff way, "Well, you're good boys," and walked out.

That was the sum total of his speech, but they all understood. From that day forward there was not a better squadron in the Corps. Many of those lads died gallantly doing their duty, but they went to their deaths gladly, for they knew that their Chief understood them and their troubles.

The R.F.C. is full of such tales of General Trenchard's astonishing hold over those who have the honour to serve under him. Surely neither at this stage of the war nor at any other stage can we afford to lose one of the greatest leaders of men whom this generation has produced.

General Henderson's Resignation.

As regards General Henderson, the reason given officially for his resignation—namely, that he could not work with General Sykes—tallies with the statement made in these pages last week that these officers did not agree when together in France early in the war. One prefers to think, however, that Sir David Henderson, in resigning, was more influenced by his consideration for the honour of the Army than for his personal feelings.

It has been one's duty to disagree with General Henderson's policy both before and during the war. That his policy of centralising supplies by making the Royal Aircraft Factory at Farnborough an aerial dockyard with absolute control over the designs and products of the Aircraft Industry was hopelessly wrong has been proved by the bitter experience of war. In a perfect world it would have been excellent. In this imperfect world, free competition is the only road to progress.

General Henderson stood for unification and centralisation. There were those who said that his sole motive was the personal ambition to have all Service aviation in his own hands. One has, however, always believed that his real motive was a desire for perfection, and that he simply did not recognise the impossibility of its achievement. He backed the wrong horse in all sincerity, and the effect came near being disastrous to those who had to pay the bill. Disaster was only averted by the personal influence of General Trenchard over the active-service aviators. What then could be more natural than that General Henderson should in his turn stand by the gallant soldier who saved the R.F.C. in its time of trouble?

Of General Henderson's aeronautical life one may say, as was said of King Charles II—"Nothing in his life became him so well as his leaving of it."—That is if he has left it.

Of Sir Godfrey Paine.

It was stated last week that Sir Godfrey Paine had resigned along with Sir David Henderson, as a protest against the removal of Sir Hugh Trenchard. It is now said that Commodore Paine tendered his resignation, was asked by an Exalted Personage to think it over, thought it over, and kept his job.

Being a Naval officer, doubtless he was not bound to support General Trenchard and General Henderson on a point touching the honour of the Army, and so, having recorded his protest, probably he has done as much as could well be expected of him.

Lord Rothermere's Position.

The position of Lord Rothermere is undoubtedly difficult. One may give him credit for the best intentions, but he may after all be only adding to Hell's proverbial pavement therewith.

It would seem that there are two very distinct Lords Rothermere. There is one who has the highest aims, and who placed the world in his debt by endowing a Chair of Literature at the University of Cambridge. There also appears to be a Lord Rothermere who ran, before he became a Cabinet Minister, a paper largely devoted to half-baked sensationalism—as, for example, when, after the murder of the late Mr. William Whiteley, the "Universal Provider," and after the murderer had been dealt with according to the law, the paper in

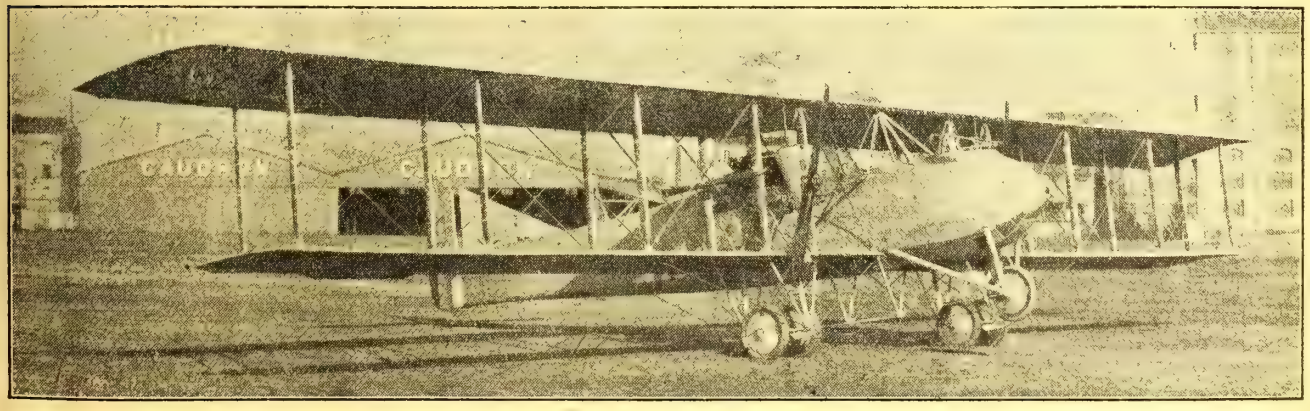


Photo and details supplied by Caudron Co. from France.

A Caudron Twin-Tractor Fuselage Biplane with two 140-h.p. Hispano-Suiza Engines. Length, 11.75m. Span, 21.13m. Area, 72.4 sq. m. Speed, 143 klm. per hour.

question, *faute de mieux* in the way of a photograph of the murderer living or dead, published a photograph of the murderer's posthumous child at the age of some few hours.

One is not quite clear which of these noblemen is responsible for the upheavals in the Command of the Royal Air Force. Presumably it is the former, seeking after the highest ideals in the way of efficiency. In such case it is to be regretted that he did not accept the advice, most respectfully tendered through this paper, that he should sit still and do nothing for six months while he was learning the elements of his new job. Thus he might have avoided certainly some irreparable mistakes and much undesirable sensation.

The Limitations of Youth.

It would appear that, like Mr. George, Lord Rothermere is *mal entouré*, being prone to take advice from the wrong people and to act upon it without seeking for the sound military reasons for things being as they are. Judging by such papers as appear to acquire the "stable tips," he has that same implicit belief in the judgment of the young as it attributed to Mr. George.

A philosopher has said, "None is omniscient, not even the youngest of us." The profundity of the satire is worthy of note by those who prate about this being a young man's war. The great German generals, whose strategy has been so remarkable, even though their tactics have been defeated by the tenacity of the French and British troops, are all over 60 years of age, and the majority of them are nearer 70.

Those who talk of Alexander the Great conquering the world before he was 30 forget that history does not record the names and ages of the generals who worked out his strategy for him. If the German Crown Prince had captured Verdun, he would have been held up as a youthful military genius—for purposes of dynastic advertisement. When he was defeated, an aged general who had failed to do the impossible—owing to French gallantry and self-sacrifice—was duly debited with having been the real commander of his army.

In the British Army no general has done better than Sir Herbert Plumer, who was not a young man when in South Africa he set forth regularly once a fortnight to relieve Mafeking, and invariably failed to reach it—a little piece of strategy which kept General Sneeman and several thousands of perfectly good Boers extremely busy, and so prevented them from capturing or preventing the relief of Kimberley. Since then some fifteen years of study and experience have but increased his value as a tactician and as an army commander.

This passion for youth is apt to become an obsession with some people, and when carried to excess it may become a national danger.

It is true that in actual fighting very young men, as a rule, have things all their own way, but in the High Command age—or at any rate middle age—has its revenge. The R.F.C. has been singularly fortunate in finding young and brilliant officers for its higher ranks. General Trenchard is only 45, which is very young indeed for his great position and influence. General Salmond, G.O.C. R.F.C. in the Field, is only 36. And General Sykes, the new C.A.S., is but 40 years of age.

Surely none could reasonably expect sound and mature judgment from younger men. So why this outcry for youthful advisers?

War by Committee.

We hear much of the great Strategic Council which Lord Rothermere is to set up. One would ask him whether he knows anything of the conferences continually held, both here and in the field, composed of the Officers Commanding various forces and their most able junior officers? Youth is there free to relate its experiences and to offer its suggestions. The mature judgment of middle age weighs and sifts those suggestions and absorbs new ideas from the experiences related. Thus the O.C. is kept up to date in his ideas and is able to form sound conclusions. And he alone gives a decision.

It may be true that "in a multitude of councillors there is wisdom," though experience ranging from Parish Councils to the Houses of Parliament leads one to doubt it, but it is certainly true that "too many cooks spoil the broth." Government by committee has brought this country to the verge of ruin. War by committee can only mean dire disaster. Lord Rothermere has never given evidence, any more than has Mr. George, of understanding the work, the aims, or the psychology, of the soldier, therefore he will be well advised to leave such matters to soldiers.

The Committee of Public Safety and all the other foolish imaginings of French Revolutionary democrats brought France low. It needed a Napoleon Bonaparte to bring her to her full power, and even that failed to reach the earlier glory of the French Monarchy, built up by loyal Generals who made war in their own way, with the full support of their King and country, and free from interference by civilians and committees.

Thus, and not otherwise, shall Great Britain attain to her full power in the air. The loyal General who is able to win that power for his King, and who possesses the full confidence of all those who have to fight under his direction, must not be permitted to go at the bidding of politicians.

Questions of Personnel.

Much capital is made, by the papers which support Mr. George and his friends, out of Lord Rothermere's removal of minor officials from the Air Ministry. None can accuse this paper of having been lenient to the shortcomings of the Hotel Bolo, and it is at once agreed that many officials ought to go. But so far as one can gather, Lord Rothermere has not even begun to remove the worst obstructionists, so one cannot see where or why any credit is as yet due to him. He has, it seems, merely come in at a moment when it had been decided by others that certain people had to go, and he brought with him the power to eject them.

When the late Sir Stanley Maude, certainly a most able general, went to Mesopotamia, he took with him many more troops than were at the disposal of his predecessor, and he found the hospital scandal already cleared up. When General Allenby, also a General of proved ability, went to Palestine, he also had greater forces at his command than had his predecessor. Therefore, before blaming General Nixon and General Murray for failure, it would be only fair to consider what they might have done if they had had the same forces as had General Maude and General Allenby. Similarly, before acclaiming Lord Rothermere as a Heaven-sent genius, it would be wise to consider what Lord Cowdray might have done if he had been invested with similar power.

Such troubles as exist are entirely on the Production side, more especially in the Technical branch, and here, one imagines, Sir William Weir may well be trusted to do what is right, if advised from the purely military point of view by the Comptroller-General of Equipment, himself a safe pilot, if elderly for active-service flying. Lord Rothermere will do well if he devotes his attention to giving effect to the recommendations of these two experienced officials, and will do better if he leaves questions of personnel and operations entirely to soldiers.—C. G. G.

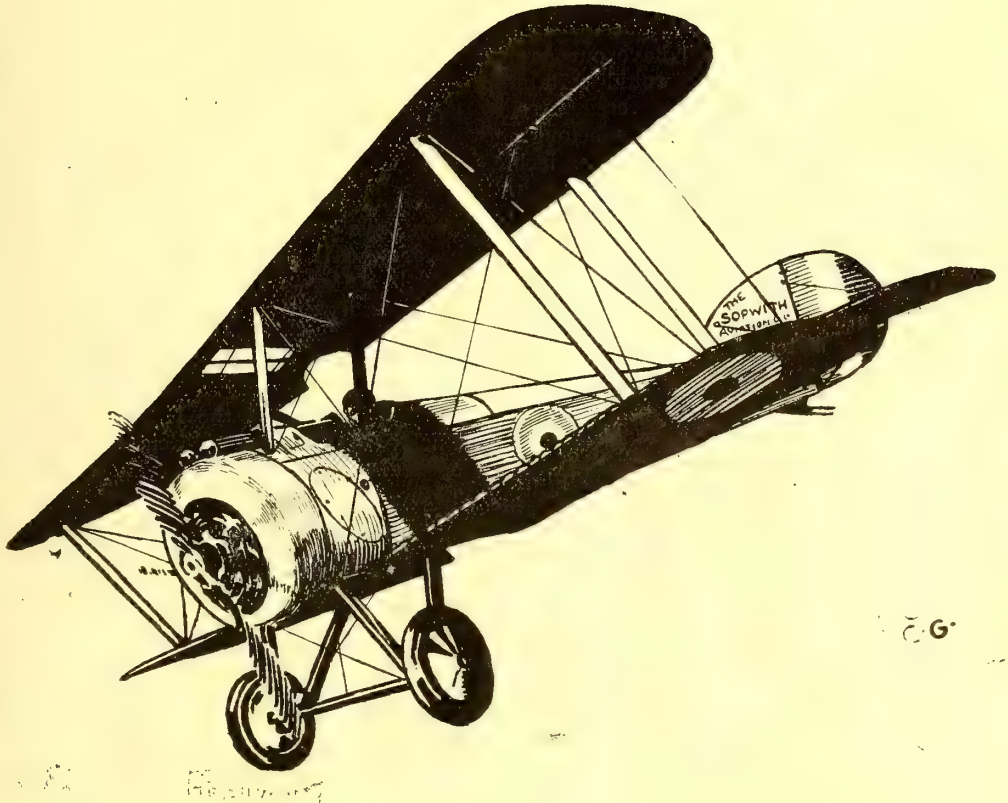


From a Drawing by Francis Dodd, Official Artist at G.H.Q.

MAJOR-GENERAL SIR HUGH MONTAGUE TRENCHARD, K.C.B., D.S.O., Aide-de-Camp to the King.

General Officer Commanding Royal Flying Corps in the Field, April, 1915, to December, 1917.
First Chief of the Air Staff–Air Council—January, 1918.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

Paris Office:
21, RUE DU MONT THABOR.

ON THE BLAZING INDISCRETION.

It is to be hoped that those who brought about the unification of the Flying Services into the R.A.F. are now beginning to appreciate the consequences of their well-meant but ill-advised action. If the whole movement from beginning to the present day had been a skilfully concocted German plot to paralyse Britain's Air Power at the most critical moment of the war it could hardly have worked out more exactly according to schedule.

Never could there have been a better proof of the dangers of a single Flying Service than has been provided by the upheaval in the Air Council. If the two Services had still existed entirely separately the removal of the Chief of one Service would not at all have affected the other. But, with only a single Service, the practically complete abolition of the people who have built up that Service from its beginning might well lead to utter chaos and the break-down of its whole fighting power.

Suppose for example that, owing to intrigues at home, the Navy broke down. We should still have our Army on which to depend. And the Army would certainly improvise a Navy until the Navy recovered itself. Similarly, with two separate Flying Services belonging to the Navy and Army respectively, if one became feeble owing to intrigue or maladministration, the other could carry on until it recovered. With a single Service there is no such opportunity for recuperation.

That the Royal Air Force has not broken down under the shock of the loss of General Trenchard's lamentable removal and the resignation of General Henderson—not to mention the resignations tendered by other officers who are not at liberty to throw in their hands at will—is testimony to the loyalty of the junior officers and officials who know that it is their duty to carry on in spite of whatever may be happening away up over their heads. Certainly the continued existence of the Flying Services as a fighting force does not place us under any obligation to the politicians who have brought about this upheaval.

The Ridiculous Theory.

At best the work of the politicians is an example of what a coiner of picturesque phrases once called a blazing indiscretion. At worst it is an ugly intrigue. One dismisses at once the absurd theory that it is all part of a deep-laid enemy plot, which, having, by years of cleverly laid planning, produced a single Air Force, at once proceeded to wreck it by instigating personal quarrels between the leading men, and intrigues between cliques.

Such things happen in the pages of Mr. William le Queux, but they are scarcely credible in real life, even in war-time when "crook plays" on the stage seem tame compared with the things which are known to be going on under the guise of munition deals. The Germans are painstaking, industrious, far-sighted, and brave. They possess many other qualities which are wholly estimable when they happen to pertain to one's friends, and wholly obnoxious when they belong to an enemy. But they are neither super-men nor are they super-devils. They are not even a race of Machiavellis.

The Family Likeness.

One has never been a believer in the alleged diabolical skill of the Germans in planning every move in the game for thirty or forty years ahead, as is the mania of some people. Racially the Germans and English are too closely allied for any such immense psychological divergence to exist. The Germans are, in fact, as prone to commit colossal blunders as are we ourselves, though perhaps of a different kind.

If they were anything else but blunderers, they would have won the war two years ago. If they were anything like as skilful in laying their plans beforehand as some people believe, they would have won the war in the first six weeks. Everyone who knows anything of Germany's military state immediately before the war knows perfectly well that Germany went into the war at least two years before she was ready for it, because, for various reasons, political, sociological, and financial, it seemed better to take the chance which then offered than to wait till she was fully prepared.

Being governed by a single-minded military aristocracy, Germany was better prepared than any other country. That is why Germany has stood up successfully against the rest of the world for over three years, and has managed to give a very fair imitation of a victorious nation. She has successfully demonstrated the superiority of aristocracy over democracy. The fact that she has not won the war is due to the inherent qualities of the remnants of the aristocracies of Britain and France which have held these nations together and have led their fighting men in spite of being hindered by pettifogging politicians and hampered by democracy

The Obvious German.

The Germans are not clever. They have that genius which is an infinite capacity for taking pains. And they have great talent in making the best use of the obvious. All the legends about their forty-year preparations for war indicate no more cleverness than that of the man who insures himself against fire. Any other than a nation of fools would begin, immediately after one victorious war such as that of 1870, to prepare for the next war.

All the stories of the Hidden Hand, which is said to blackmail our chief politicians into impotence, indicate no real cleverness, but merely the full use of obvious methods.

Many years ago a soldier of one's acquaintance was talking to a German officer, a great friend of his, about the German Secret Service, and the German said:—"Yes! We do things pretty thoroughly. For example, in case we find it necessary to invade England, we have a complete list of every post-office and sub-post-office in the British Isles, with particulars as to which are the places where there are telegraph instruments to be found, and which are the places where money is kept for paying money orders. We even have a list of the names of the individual post-masters and post-mistresses."

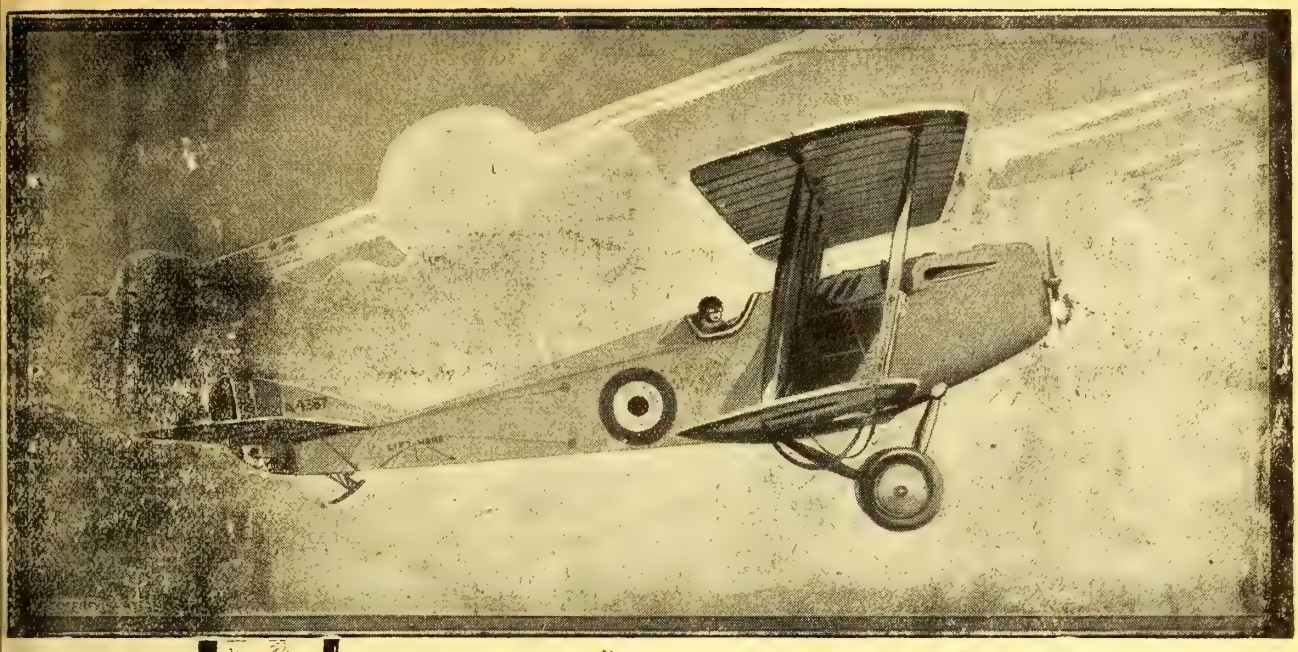
"Good God!" said the simple British soldier. "How on Earth did you get all that information? It must have cost you thousands!"

"No!" said the German. "We merely went into your General Post Office in London, and paid sixpence for your so interesting Post Office Guide."

The Application of the Story.

Getting hold of information with which to intimidate politicians is just about as simple as that. And the use of information so obtained is just about as easy as robbing the till of a captured post-office, or commandeering its telegraph instruments. This is the more so when one has to deal with a country like England, in which the Nonconformist Conscience is such a dominating power that a really great man like the late Sir Charles Dilke could be ruined for life over a peccadillo which would not even make a Continental damsel blush.

The cardinal sin in this country is that of being found out. The pet minor sins of our chief politicians are common knowledge to all. Yet that does not make

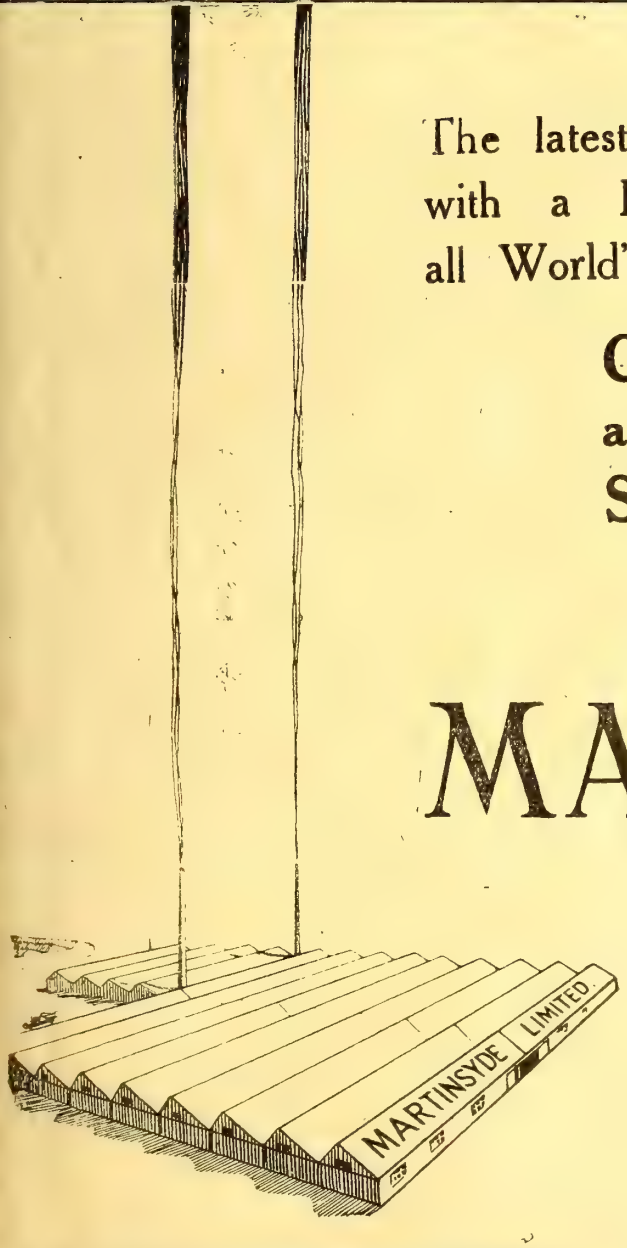


The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds all World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE



BROOKLANDS.
Head Office

WOKING, Surrey.

their fear of public exposure any less. Thus they are able—to put it politely—to bring pressure to bear on one another when their own interests or the interests of their party or clique or protégés so demand. The results may be disastrous to the Services or to the country, but that is a minor matter to a politician so long as he can hold his job, and remain a whited sepulchre, even with some spots on his reputation by way of Futurist decorations.

Which is why one does not believe in these diabolically clever German plots.

The Effect at the Bolo.

Thus one may absolve the Germans of having had any hand in the affair which has caused such an upheaval in the Flying Services. The whole thing has been caused by our own damned foolishness, and it serves us right.

The people with whom one has sympathy are the hard-working officials—Service and civilian—who have to carry on with their jobs at the Hotel Bolo—begging its pardon, the Cecil—while earthquakes are happening all round them.

Even as it is, this upheaval has had very serious effects on the work of the Air Force staff, for none can keep his attention fixed firmly on the all-important work of filling up forms, when every two minutes someone pops his head in at the door and says, "Have you heard that Smith has resigned?" or "Is it true that Jones has got the boot?"

Each minor official is so anxious about keeping his own job that he forgets his work in order to secure himself in office. A humorist remarked the other day, "I hear that the Seccotine and Croid people are going to declare enormous dividends this year!" and when some innocent asked him, "Why, particularly?" he replied, "Because of the sales of their stuff to all the people who are trying to cement themselves into their chairs at the Bolo."

Anyhow, the net result has been to paralyse the work at the Air Ministry, partly through the fear of some officials over losing their jobs, partly through the anger of others over the whole business, and partly through the gossiping tendencies of others, who spend their whole time talking about it all.

Fortunately there happens to be a fully adequate supply of aeroplanes and engines in stock for the people at the front. Also, orders and material in hand will keep the aircraft factories going for a long time ahead. Therefore the effect of the upheaval, so far as supplies for the active-service people are concerned, is, happily, nil; nor, indeed, would it matter much if the whole Hotel Cecil took a month's holiday in which to discuss its internal politics.

The Effect in the Field.

One cannot, naturally, write openly of the effect of this ugly business on the aviators in the field. One knows, however, that the whole of the R.F.C. is boiling with black rage against the politicians who have dismissed their great leader. If any of the political people dared to show their faces in an aerodrome in France to-day they would receive but short shrift.

It is perhaps as well for the politicians that the active-service aviators are too busy fighting to give attention to affairs at home. There might be some unpleasant truths told if matters were otherwise. As it is, the fighting men of the Flying Services are too loyal to their King to be put off their work by political intriguers.

Also, if they have a suspicion that enemy intrigue has anything to do with the affair, it is not likely to make them any more tender towards their open and honourable enemies in the field. There are no Bolsheviks in the Flying Services, whatever there may be among politicians. All are full out to win the war.

Affairs in London will not abate one whit the energy and determination of the aviators at the Front. Like the famous Gloucesters, who won the right to wear their helmet badges on the back as well as the front of their headgear, by fighting to a finish and defeating an enemy force which attacked them in front and rear, the R.F.C. will win as proud a tradition by defeating its enemies abroad in spite of intrigues at home.

THE AIR FORCE'S TROUBLES IN THE HOUSE.

Resignation of General Sir H. Trenchard.

On April 18th **Mr. Pringle** asked the Prime Minister whether, before the resignation of Maj.-Gen. Sir Hugh Trenchard was accepted, the differences or policy between Gen. Trenchard and the Air Minister came before the War Cabinet; and whether he can, consistently with public interest, state the questions of policy upon which a difference of opinion arose between the Air Minister and Gen. Trenchard?

Mr. Bonar Law: The answer to the first part of the question is in the affirmative, and to the last part in the negative.

Mr. Pringle: Does the right hon. gentleman not realise that great public interest is taken in this matter, and can he not see his way to make a statement which will allay some of the unrest which has arisen?

Mr. Bonar Law: I realise that there is great public interest in it, but I think the House will see that it is obvious one cannot discuss in public questions of principle of that kind.

Mr. Pringle: Is it not the case that the question of principle is one not affecting any war policy, but simply as to the methods of organisation in which the leading expert of the Air Staff had regard to efficiency in the field and the Air Minister had regard to advertising in the Press?

Mr. Bonar Law: The hon. member is apparently giving his own version of the difference of opinion. As I have said, in our opinion it is not desirable to discuss the matter by way of question and answer.

Colonel Sir H. Verney: Has the right hon. gentleman any idea of the dismay and disgust in the Air Force in France over this matter?

Mr. Bonar Law: No, Sir; I think it is obvious that I cannot be expected to give an answer to a question of that kind, which would give rise to difference of opinion.

Mr. Hogge: As the Government have got rid of the head officers of the Navy, the Army, and the Air Force, can the right hon. gentleman say how long this practice is to continue of getting rid of competent people?

Mr. Joynson-Hicks: Will the right hon. gentleman consider whether it would not be possible to make a statement adding a little more information, which will give no help to the enemy, but might allay feelings which to some extent undoubtedly exist?

Mr. Bonar Law: I am quite ready to consider that, like any other desire on the part of the House to discuss a question. I do not think it is desirable, at all events in question and answer, to discuss a subject of this kind.

Mr. Pringle: I beg to give notice that I shall raise this question on the adjournment to-night.

Resignation of General Sir D. Henderson.

Mr. Pringle asked whether, since the resignation of Major-General Sir Hugh Trenchard, any and, if so, what other member or members of the Air Council has or have tendered his or their resignation?

Mr. Bonar Law: The Vice-President of the Council, Lieut.-General Sir David Henderson, K.C.B., D.S.O., has tendered his resignation, on the ground that he felt that he would be unable to work with the new Chief of the Air Staff.

Mr. Billing: Is it not a fact that for two years and a-half we have been endeavouring to get a strong policy in our Air Service, and that now we have a Minister who is taking a strong policy this House seems not to agree with him?

Mr. Pringle: What is the policy?

Mr. Billing: Having his orders obeyed.

Mr. Pringle: Getting advertisement in the Press.

Royal Air Force Staff.

Mr. Llewellyn Williams asked the Under-Secretary of State to the Air Ministry whether, in view of the complaint of Lord Rothermere that a great number of excellent officers are engaged in filling up unnecessary forms, he will say if the number of officers in the Department of the Controller-General of Equipment has recently gone up from 110 to 350, and if, whereas the old Equipment Gunnery and Organisation Gunnery of the War Office had only twenty officers, the number in the Directory of Armament, which has taken over the functions of those two departments, has been raised to 140; and whether these increases

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)

were made with the knowledge and approval of Lord Rothermere?

Major Baird (*in a written answer*): The Department of the Controller-General of Equipment is a new department formed on the creation of the Air Ministry, which took over equipment responsibilities for both the Royal Flying Corps and the Royal Naval Air Service. The number of officers was 351 when the department was formed and it is now 317. The policy was to include as many attached officers as possible, so as to keep a free hand to reduce as consolidation of Royal Flying Corps and Royal Naval Air Service services proceeds and decentralisation of services into Air Force areas is arranged. This and other cognate questions in the Air Ministry are being investigated by a strong committee appointed ad hoc. As regards the second part of the question, the gunnery section forms part of the armament branch in the Department of the Director-General of Aircraft Production, who is responsible to the Minister of Munitions.

BUSINESS OF THE HOUSE.

Sir R. Cooper: Do I understand that to-night, when the motion for adjournment comes on, the Air Service will not be represented?

Mr. Bonar Law: No. I did not say that, but I did wish it to be made quite plain that I do not feel bound to attend on the adjournment whenever an individual member wishes to raise a question.

Mr. Billing: Will any member of the War Cabinet attend?

Mr. Pringle: I can say what the right hon. gentleman was doing the last time I raised a matter on the adjournment.

Mr. Hogge: Playing at chess!

Mr. Speaker: I really must deprecate these very offensive observations. I have already had to reprimand one of the Press Gallery for introducing into the public Press references to the private acts of Ministers and of members when they are in attendance here. If, in addition to that, hon. members are going to make in this House statements as to what Ministers and members do in the lobbies and the smoke-room and the dining room, then life here would become intolerable.

[It would certainly be to the advantage of the nation if life in the House of Commons were made so intolerable for most of the present Cabinet as to force them to leave it. Meantime, while they insist on remaining to inflict themselves on a suffering country, the least they can do is to attend to their businesses instead of flouting the country by going out to play when their duty should be to listen to the complaints of the few of the people's representatives who have the pluck to complain about the Government's misdeeds.—Ed.]

ON THE ADJOURNMENT.

Mr. Pringle said that the Leader of the House had intimated that he could not be present, that he would not be present, and that the Secretary to the Air Ministry would not be there. Mr. Bonar Law was not conversant with the facts of Major-General Trenchard's resignation. It would be more satisfactory if there were to be a discussion, and was willing that a whole day should be given to the discussion of this subject. Motion, by leave, withdrawn.

* * *

On April 22nd **Mr. Bonar Law**, asked by **Commander Bellairs** whether his attention had been drawn to the anxiety created by the resignations of the two officers of greatest experience in the Air Service from the Air Council, and whether he would give a day for discussion in order that an adequate statement could be made on the administration of the Air Council, and, if necessary, discussed, said the Government would be glad to arrange for such a discussion if there was a general desire for it. The most convenient occasion for it would be on the Vote for the Air Ministry in Supply.

Major Sir J. Simon: Did the War Cabinet ever see General Trenchard about his difficulties before the Government dispensed with his services?

Mr. Bonar Law: I do not think that question arises.

Sir E. Carson: Can my right hon. friend say when this discussion will take place? We do not want to have it postponed.

Lord H. Cecil: I hope it will be before next Monday.

Mr. Bonar Law: It will be as early as possible. The subject for Supply day this week—Thursday—has already been allotted. We hope, however, to arrange for some day next week before Thursday.

Mr. McKenna: There would be no objection on this side to postponing the Munition Vote, which has been put down for Thursday next, and taking the Vote for the Air Ministry.

Mr. Bonar Law: I shall see, then, whether it is possible to arrange it for Thursday of this week.

"THE AEROPLANE"—PRICE SIXPENCE.

By agreement with the contemporary aeronautical papers it has been decided that on and after the first issue in May the price of all such weekly papers shall be raised to sixpence. This will first take effect on the issue of THE AEROPLANE dated May 1st, which will be next week's issue.

This step has been rendered necessary by two facts—firstly, the shortage of paper, and, secondly, the ever-increasing price of paper.

In order to conserve the available supply of paper to the utmost it is only right to prevent waste, and any copies which are sold to people who do not actually want them are obviously wasted. People who really want THE AEROPLANE will be willing to pay sixpence for it. Those who will not pay sixpence obviously do not want the paper. Thus waste will be prevented.

At the same time every effort will be made to make the sixpenny AEROPLANE worth the money. It is, unfortunately, impossible to buy better paper than that which is now being used, for it seems that the whole available supply of decent paper has been bought for a long way ahead by the good-class picture papers. But it is hoped that when the conditions of the paper market settle down under the new regulations, and when it is discovered how the available supplies of paper are to be distributed, it may be possible in future to give more and better value in the way of pictures and reading matter, and possibly better paper, for sixpence than is now obtainable for threepence.

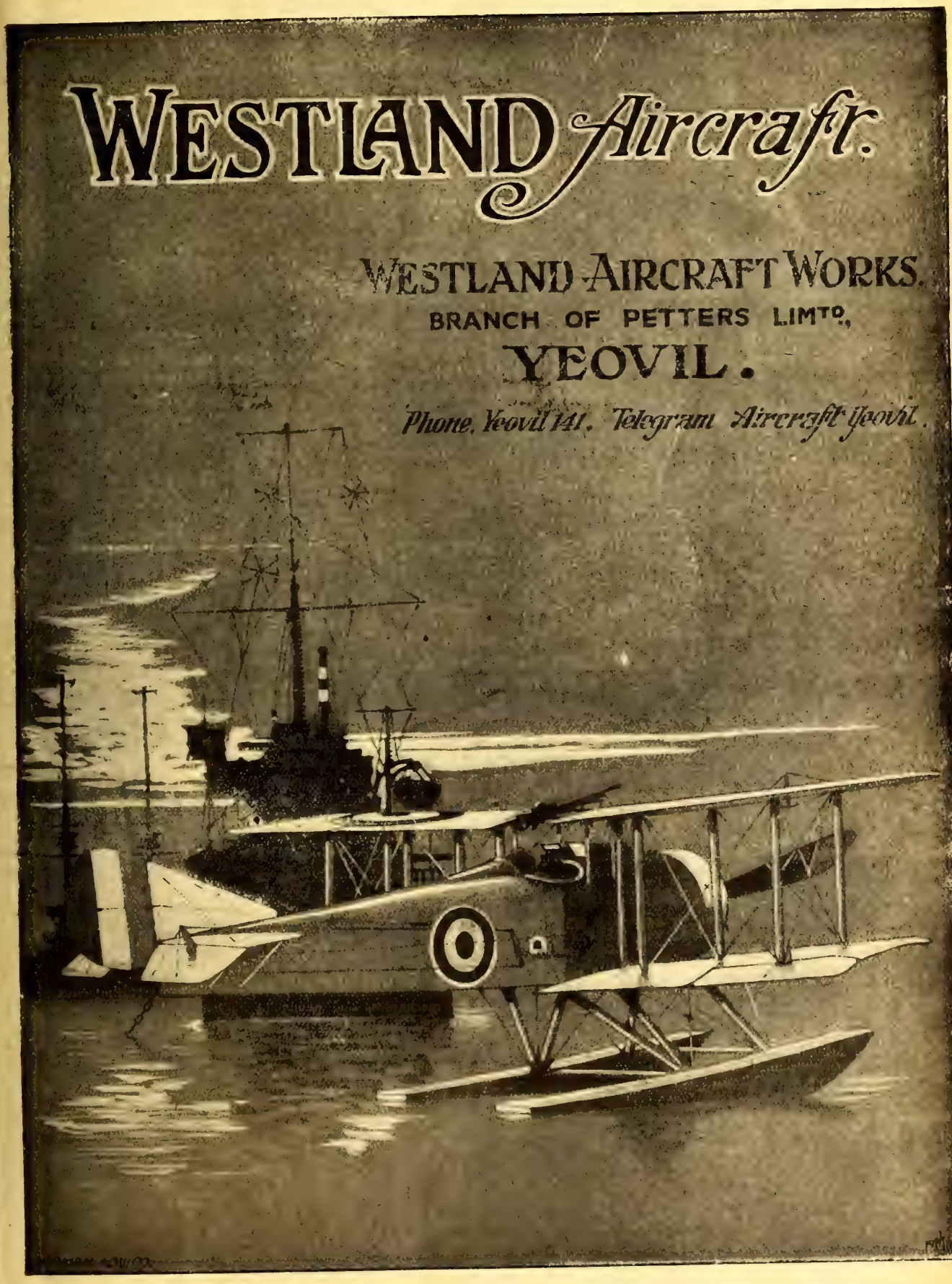
At the same time, if readers will consider how much the prices of commodities have gone up all round during the war, one believes that few of them will quarrel with the new price. When a penny egg costs 4d.—and is stale at that—and when a 3d. whiskey costs 9d., and even then is only at half-strength, and very small for its age, one is inclined to think that the mental pabulum provided by THE AEROPLANE for 6d. will be considered worth the money in war-time.

People are always willing to pay for amusement and for information on technical matters. They will even stand being told the truth if they have to pay for hearing it, instead of having it thrust upon them for nothing. One hopes, therefore, to provide enough of all these desired commodities to give readers full value.

One wishes readers to understand clearly that the raising of the price is not a profiteering effort. It is therefore well to point out that, though the paper will be sold in future at 6d. per copy retail, the price which the proprietors actually obtain from the wholesale newsagents is nearer 3d. than 4d. The price of the better paper on which THE AEROPLANE was printed before the war was about a penny a pound, whereas the stuff on which it is now printed costs anywhere between 6d. and 9d. a pound, and is likely to cost more. A sum in simple arithmetic, with the assistance of a letter-weighing machine, will soon show whether there is any profit on the sale of the paper.

All other charges, such as printing, publishing, office expenses, and so forth, have to be found out of advertisement income, so readers may easily see for themselves whether any profit is being made out of them or not.

At the same time, the proprietors of THE AEROPLANE are determined that all those who really wish to have this paper regularly, in spite of the increased price, shall have it. Therefore, if any difficulty is found in obtaining it from newsagents, the proprietors particularly desire to hear all about it. Letters on this subject should be addressed to THE AEROPLANE, 166, Piccadilly, W.1, giving full particulars as to any reasons alleged by news-agents for the difficulty of getting the paper, and also giving the name and address of the news-agents.


WESTLAND Aircraft.
WESTLAND AIRCRAFT WORKS.
BRANCH OF PETTERS LIMTD.
YEOVIL.
Phone, Yeovil 141. Telegram Aircraft Yeovil.

MANFRED VON RICHTHOFEN.

The greatest of our enemies in the air, Rittmeister Freiherr Manfred von Richthofen, is dead. The R.F.C., his particular foes, will have heard the news with mixed feelings. They will rejoice that he is out of action, but they will regret sincerely the death of a gallant gentleman who fell bravely doing his duty.

Only a few days ago one of the best of our own air-fighters expressed the hope that he and von Richthofen might survive the war, so that they might compare notes.

Some few months ago a dinner was given by his squadron to one of our best men, in honour of his winning the D.S.O. In returning thanks the hero of the evening, as gallant a lad as ever flew, stood up and proposed the health of von Richthofen. And the fighting men of the squadron duly honoured an enemy whom they respected. Both the proposer of the toast and his enemy are now dead. One hopes that beyond the shadows they have met as gallant enemies do when they have fought a good fight and peace has come to them.

Those two incidents indicate, one believes, the feelings of the R.F.C. towards Rittmeister von Richthofen. There is not one in the Corps who would not gladly have killed him. But there is not one who would not equally gladly have shaken hands with him had he been brought down without being killed, or who would not so have shaken hands if brought down by him.

Manfred von Richthofen came of a good Junker family, as is evidenced by the use of the nobiliary prefix to his name. His people were landowners, for generations much given to horse-riding and shooting, so that he was of the right breed for a fighting pilot, but were not as a rule professional soldiers.

From his own memoirs one learns that he had adopted the profession of arms and was already a lieutenant of Uhlans before the outbreak of war. He only took to flying in 1915, and spent most of that year as an observer on the Russian front. Late in the year he became a pilot, and, after some service near Verdun, returned to Russia as the pilot of a C. type (reconnaissance) machine. There he was selected in August, 1916, by the great Bölcke as a recruit for his Jagdstäffel of Fokkers.

It was not till September, 1916, that von Richthofen brought down his first British opponent, and, as his score practically started from that date, he has been the victor in some 80 aerial affairs in nineteen months, out of which period he was away from the battle area for some months. One who has written of his death questions the figures claimed for him, remarking with the meanness typical of Fleet Street that "experience has taught us that German official statements are by no means to be implicitly trusted, and the general opinion in British aviation circles is that Richthofen was credited with all the machines brought down by the squadron—or 'circus' as the Germans call it—which he had commanded since the death of Boelke."

Apart from the fact that German figures are as a rule singularly accurate—except when deliberate strategic lying is done—and that the Bölcke squadron was never commanded by von Richthofen, and that the Germans never called the von Richthofen Jagdstäffel a "circus"—the word being purely an invention of the R.F.C.—it is an absolute lie to say that it is the opinion of British aviators that von Richthofen was credited with the score of his squadron. The squadron score was given officially long ago as some 200 "aerial victories."

The only deduction to be made from the 80 claimed is due to the fact that the Germans have always counted sunk kite-balloons along with aeroplanes as "victories." Many a fighting pilot says that he would much rather fight any German aeroplane than attack a K.B. through its screen of Archies, so perhaps the Germans are justified in counting balloons in the score. If one deducts 10 K.Bs. one still has to give him credit for 70 aeroplanes, and the R.F.C. knows better than anyone else how closely those figures have been approached by some of our own best fighting pilots.

His death is bound to have a gravely depressing effect on the German Flying Service, for obviously the younger and less brave pilots will argue that if a von Richthofen cannot survive their chances must be small. Equally his death is an encouragement to the younger French and British pilots, who can no longer imagine that every skilful German who attacks them is von Richthofen himself. Which is the fullest possible justification of the policy of the British Army in refusing to make "star turns" of its crack pilots, in spite of its badgering by newspaper proprietors whose only desire is sensation, regardless of whether it is healthy or not.

However, Manfred von Richthofen is dead. He was a brave man, a clean fighter, and an aristocrat. May he rest in peace.—C. G. G.

AN AIR MINISTRY APPOINTMENT.

The Secretary of State for the Royal Air Force has appointed Mr. Bertram Jones to be Civil Assistant to the Controller-General of Equipment in the Air Ministry.

ANOTHER AIR MINISTRY APPOINTMENT.

The post of assistant secretary of his Majesty's Office of Works having become vacant by the appointment of Mr. W. A. Robinson, C.B., C.B.E., to be Permanent Secretary to the Air Council in the Air Ministry, it has been decided to postpone the appointment of a successor until after the war.

Mr. James Eggar, O.B.E., principal clerk, will act as assistant secretary in the meantime.

The First Commissioner of Works has also appointed Mr. E. H. Bright, C.B., M.V.O., Principal Clerk of Contracts, to be Director of Contracts and Labour.

NEW WORK FOR A PIONEER.

J. Samuel White & Co., Ltd., of Cowes, Isle of Wight, notify that Wing Commander Gerald Aldwell, R.N. (retired), has been appointed General Manager of the Aviation Department of that firm.

Commander Aldwell will be remembered by those connected with aviation in its early days as a pioneer of Naval aviation, for he was one of the first Naval engineer-officers to be appointed for aviation duties. As an engineer-lieutenant he was appointed to the Eastchurch Air Station, and took his pilot's certificate, No. 630, on a Short biplane, his certificate being dated 15th September, 1913. Ever since he has been closely connected with the R.N.A.S.

In February, 1914, he participated in a serious aeroplane accident with another officer and was so badly injured that for some months he was incapacitated from all duty. In the early days of the war, although still suffering from his injuries, he did highly valuable work in charge of a Recruiting Station for air mechanics, and owing to his excellent judgment many of the most valuable men in the R.N.A.S. were admitted to the honour of serving His Majesty.

Although he never completely recovered from his injuries he was appointed to technical duties abroad and did very valuable work until his health broke down entirely and he was invalided out of the Service. While on active service his uniform cheerfulness under adverse circumstances, his personal gallantry under fire, and his strong sense of justice, won for him the highest regard of all who served with or under him.

Prior to taking up aviation Commander Aldwell was connected intimately with the early experiments in submarines, and while in the Submarine Service his name was officially noted for early promotion because of his gallantry in rescuing ratings from a submarine in which an explosion had occurred.

Commander Aldwell's long and extensive engineering knowledge, coupled to his great experience of aviation both before and during the war, and his close connection with Active Service needs and methods should make him an extremely valuable acquisition to the Staff of Samuel White & Company. He will carry with him in this new work the best wishes of all other pioneers of Service aviation, and of a multitude of the younger generation who have had the pleasure of serving with him.

CELLON

LIMITED.

Broad Street House, New Broad Street, London, E.C.2.

Change of Address.

Please note that we are removing to larger and more centrally situated offices, and that on and after the 29th April, 1918, our address will be

22, CORK STREET,
LONDON, W.1.

Our Telephone Number will be **Gerrard 440** (2 lines), and our Telegraphic Address **"Ajawb, Reg, London."**

CELLON, LTD.

ROYAL APPROVAL.

The following was published in the Press on April 22nd :—

The Minister of Munitions has received the King's commands to convey to the officials of the Ministry, to the employers, and to the munition workers throughout the country, both men and women, his Majesty's high approval of the exertions made during this critical time and his satisfaction at the remarkable results achieved.

The King has learned from the military authorities that practically all the losses and expenditure of munitions during the battle have already been made good without any undue depletion of normal reserves out of the resources which had been held in readiness and by the additional effort which has been made. There are now actually more serviceable guns, machine-guns, and aeroplanes with the British Armies in the field than there were on the eve of the German attack The other supplies of all kinds are forthcoming in abundance.

The King has commanded the Minister of Munitions to express his great pleasure to the workers and all engaged in this vital task. Travelling constantly about the country with the Queen from one munitions centre to another the King has had ample opportunity of witnessing the strenuous efforts which are being made by the men, and certainly not less by the women, to keep the soldiers who are fighting supplied with all they need, and also of admiring the organising ability displayed in so many ways and on so great a scale. The King is deeply impressed by the fact that much-needed holidays have been cheerfully given up and additional exertions made at a time when many severe food restrictions had come into force, and that, in spite of large numbers of munition workers having left the workshops for the Army during the last six months, the outputs of every kind have not only been maintained but have steadily increased. Accordingly, the King has directed the Minister to convey his Majesty's thanks to all concerned.

THE DEATH OF M. GEORGES JUCHMES.

Those who were connected with the early days of ballooning and airship work will regret to hear of the death of Georges Juchmès, who died in Paris on February 24th after a long and painful illness.

The name of Georges Juchmès will always remain intimately associated with the history of aeronautics in connection with the period of transition from the classic days of ballooning in the last century to the prodigious developments of to-day.

M. Juchmès was born in Paris on July 18th, 1874, and was seventeen years of age when he made his first balloon descent as a pilot in 1891, after having been the pupil of the famous Georges Besançon. When the construction of airships became a regular industry M. Juchmès was appointed director and manager of the aeronautical establishments at Moisson created by MM. Lebaudy, and he passed eight years there working with M. Julliot at the construction and tests of the first Lebaudy airships—the *Patrie*, *République*, and *Liberté*, the performances of which surpassed all hopes. His services to aeronautics won him in 1913 the Croix Chevalier Legion d'honneur.

At the outbreak of war he was mobilised as a Lieutenant-Pilot of military airships, and did his duty gallantly. He was shut up in Maubeuge during the siege, but succeeded in escaping and was appointed to Chalais-Meudon where he worked at the development of the parachute which is now used on all French airships and kite balloons. At the time of his death he was the chief of the workshops which he had set up for the construction of these vehicles.

M. Juchmès also held the medal for saving life given by the French Government for his devotion to duty as Mayor of Moisson through the floods of 1910. The parents of M. Juchmès were Lorrainers, and he is another example of the good service done to France before and during the war by the inhabitants of the debatable territory.

THE FRIEDRICHSHAFEN EXPLOSIONS.

Berne, April 15th.—" La Suisse " learns that shortly after 8 o'clock on Saturday evening, April 13th, the workshops at Manzell, near Friedrichshafen, formerly engaged in building Zeppelins and now manufacturing aeroplanes, were burnt down. The blaze was visible all over eastern Switzerland. Swiss returning home have been made to promise not to reveal the extent of the disaster.

Zurich, April 16th.—The latest reports of the fire at Friedrichshafen indicate that the whole of the extensive aeroplane works at Manzell were completely destroyed. The loss to the German military aircraft industry is exceedingly serious. Incendiarism is suspected.

A telegram from Geneva to the " Temps " states that definite information on the subject of the fire in the Gotha works at Friedrichshafen shows that it was caused by bombardment by Allied airmen.

[The " Gotha " factory was, in fact, the factory where Friedrichshafen bombers are made. They are twin-engined machines of quite a different type.—Ed.]

The factory has been entirely destroyed. It is definitely reported in Germany that at the time of the fire on Saturday there were 30 complete squadrons of Gothas at Friedrichshafen, which were being kept in reserve for the special purpose of fighting the American aerial fleet.

[This, of course, is pure rot. Thirty squadrons would be at least 450 machines. And anyhow, they are not fighting machines but bombers pure and simple. Why the American fleet should be dragged in is not apparent.—Ed.]

The " Matin " learns from its Zurich correspondent that two Zeppelins and 40 giant aeroplanes were destroyed.

[This is a much more likely story.—Ed.]

Geneva, April 16th.—The Exchange Telegraph Company's correspondent says that two Swiss travellers who have just arrived in Constance declare that the people of Friedrichshafen were in such a state of panic that throughout Sunday there was a frenzied rush of the inhabitants towards the localities on the borders of the lake, and even as far as Constance itself.

The explosions caused a most frightful panic in the town mingled as they were with the screech of the alarm syrens which, in fear of something unknown, suddenly mingled their strident shrieks with the pandemonium and completed the work of sowing terror among the inhabitants. Throughout Sunday the explosions and fires continued, doing considerable damage not only in the workshops themselves, but also in the whole of the western part of Friedrichshafen, where several houses became a prey to the flames or were demolished by the fall of enormous pieces of material, and above all by the hydrogen vessels which were sent hurtling through the air by the explosions.

[The explosion of the hydrogen bottles is probably at the root of the whole yarn.—Ed.]

It is stated at Constance that two " grand model " Zeppelins were destroyed and two vast gas reservoirs. Added to these a number of giant aeroplanes of the Friedrichshafen type were wiped out.

Approximately something like 40 workshops must have been consumed, and the Maybach motors in particular suffered. The works are now guarded by a double cordon of troops, and bodies of police are still engaged in removing the charred remains of victims of the fires. From one source it is learned that the number of victims totals about 140 dead and 200 injured.

[Most of these statements are obvious lies, and the truth probably is halfway between them and the veiled disclosures of the German communiqué, which will be found in its proper place.—Ed.

DO WE WANT AIRCRAFT?

The following letter has been received from an important firm of metal merchants :—

Sir,—At the present moment when the output of aeroplanes is of vital importance it may interest you to learn that the Air Board have decided to dispense with merchants of this country who have been carrying stocks of aircraft steel, on the ground that available supplies are not sufficient to go round.

Notwithstanding this, however, they are opening stores in various parts and supplying consumers from same, which practically means that they are acting as merchants themselves.

If this would in any way help to relieve the situation we should be patriotic enough to accept their decision and devote our energies in other directions, but we hear on every hand nothing but complaints of the delay and difficulty experienced by aircraft contractors in obtaining their supplies from Air Board Stores, which would not have occurred had the warehouses and staff of the stockholding merchants, with their years of experience, been taken over.

[Is it really at all likely that a number of Government embusqués without business experience, or of wounded officers likewise without business training, are likely to handle the distribution of steel supplies as well as people who have made such work the business of their lives? It is this kind of foolishness which fills the Hotel Bolo with useless people, not the necessary staff work of the Army, which is very efficiently done.—Ed.]

AMERICAN REORGANISATION.

The Washington correspondent of the Associated Press telegraphs on April 22nd :—

"President Wilson has definitely decided on a readjustment of the aircraft programme, and Mr. Baker has been directed to carry it out. It is intimated that production will be put in the hands of one man. An announcement on the subject may be expected soon."

[And quite time, too, from all one hears.—Ed.]

DRAUGHTS AT THE HOTEL CECIL.

Doubtless the epidemic of colds which broke out in the Hotel Cecil and its ancillary edifices last week was due to the cold weather and the general draughtiness of the buildings. Or it may have been because the medical examination of the entire male staff, with a view to discovering how many of them were fit for active service, necessitated a certain amount of standing around insufficiently clad. It seems improbable that the gusts were entirely vertical.

One refuses to believe that the revolving front door had to be fitted with a brake to prevent it from turning into a turbine, or that life-lines had to be fitted along the grand staircase to prevent the entire staff from being propelled to the roof by the wind blowing up the building.

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines like Rolls-Royce Cars are the Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE



NAVAL and MILITARY · AERONAUTICS ·



FROM THE "LONDON GAZETTE."

Admiralty, April 9th.

R.N.A.S.—Flt. Lt. to be Flt. Comdr.—L. D. McKean, June 30th, 1917.

War Office, April 15th.

The following are among the Decorations and Medals awarded by the Allied Powers at various dates to the British Forces for distinguished services rendered during the course of the campaign. The King has given unrestricted permission in all cases to wear the Decorations and Medals in question :—

Conferred by the King of the Belgians.

Croix de Guerre.

77880 2nd Cl. Air. Mech. F. Goodspeed, R.F.C. (Hackney, N.E.)
78272 2nd Class Air Mech. T. F. Goodwin, R.F.C. (Halifax, Yorks).
5293 Serjt. (Flt. Serjt.) A. J. Graham, R.F.C. (Tetbury, Gloucestershire).
98931 Cpl. G. Holmes, R.F.C. (Yeovil).
7890 Cpl. A. R. Jackson, R.F.C. (West Norwood, S.E.)
6413 Cpl. J. O. Jones, R.F.C. (Llandudno).
8506 1st Cl. Air Mech. S. O. Kelly, R.F.C. (Cahir, Co. Tipperary).
21306 Flt. Serjt. L. C. King, R.F.C. (Devizes, Wilts.).
6188 Cpl. R. E. Knight, R.F.C. (Birmingham).
9922 1st Cl. Air Mech. W. F. Lange, R.F.C. (Westminster).
2410 Serjt. C. Lewis, R.F.C. (Merthyr Tydvil, Glamorgan).
14796 1st Cl. Air Mech. (actg. Cpl.) J. A. Macdonald, R.F.C. (Dumfries).
106099 2nd Cl. Air Mech. J. McMechan, R.F.C. (Horwich, Lancashire).
106809 Cpl. W. Metson, R.F.C. (Brentwood, Essex).
9856 1st Cl. Air Mech. H. W. Moore, R.F.C. (Devonport).
8216 1st Cl. Air Mech. R. C. Platford, R.F.C. (Edmonton, N.E.).
2290 Serjt. (Flt. Serjt.) S. Potts, R.F.C. (Whickham, Durham).
4916 1st Cl. Air Mech. (actg. Cpl.) J. Reardon, R.F.C. (Stepney, E.).
6372 Cpl. F. Spencer, R.F.C. (Oswestry, Salop).
7916 Serjt. (Flt. Serjt.) F. W. Stroud, R.F.C. (Woking, Surrey).
8755 Cpl. (actg. Serjt.) G. R. Sykes, R.F.C. (Barnet).
44986 Sec. Cl. Air Mech. F. J. Tingey, R.F.C. (Forest Gate, Essex).
77881 Sec. Cl. Air Mech. W. Titchmarsh, R.F.C. (Ealing, W.).
4492 1st Cl. Air Mech. C. H. Topps, R.F.C. (Cirencester, Gloucestershire).
5521 Cpl. G. Whitehead, R.F.C. (Manchester).
61929 1st Cl. Air Mech. W. Wilkes, R.F.C. (Walsall).

War Office, April 16th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing. Wing Comdr.—Lt. (temp. Maj.) E. L. Conran, M.C., Lrs., from Sqdn. Comdr., and to be temp. Lt.-Col. while so empld. (March 30th).

Air Ministry, April 16th.

R.A.F.—The following appointments are made at the Air Ministry :—

S.O., 2nd Class.—Lt. J. B. F. Watson, and to be temp. Maj. while so empld. (April 1st).

S.O., 3rd Class (and to be temp. Capt. while so empld.) :—Lt. (Hon. Capt.) W. P. Nicholls, Sec. Lt. H. M. Piper (April 1st).

Flying Branch.—Maj. F. F. Minchin, M.C., to be temp. Lt.-Col. while empld. as Wing Comdr. (April 5th, seny. April 1st).

Lt. (temp. Capt.) K. R. Park, M.C., to be temp. Maj. while commanding sqdn. (April 9th).

To be be temp. Capt. while commanding a Flight.—Lt. N. Crompton (April 1st); Sec. Lt. C. F. King (April 5th); Lt. J. Hutchings (April 7th); Lt. N. Comper, Lt. A. W. Beauchamp-Proctor, Lt. H. F. Davison (April 8th); Sec. Lt. R. S. Bell to be temp. Lt. while so empld. as Balloon Comdr. (April 1st).

Administrative Branch.—H. W. Davies is granted a temp. commission as Maj. (April 15th).

L. J. Robertson (Capt., R. Defence Force) to be temp. Capt. while empld. as Courts-Martial Officer (April 1st).

Lt. C. E. Bagram to be temp. Capt. while empld. as Courts-Martial Officer (April 2nd).

Sec. Lt. J. F. Hewitt relinquishes his commission on account of ill-health contracted on active service (April 17th).

The following resign their commissions :—Lt. W. MacLanachan, to resume his medical studies; Sec. Lt. (Qrmr. and Hon. Maj., ret pay) A. Beattie; Sec. Lt. J. H. Higginbottom (April 17th).

Admiralty, April 17th.

The King has been pleased to approve of the award of the following decoration for services in action with enemy submarines :—

The Distinguished Service Cross.

Flt. Lt. H. L. Nunn, R.N.A.S.

The King has been pleased to approve of the award of the following decorations and medals to officers and men of the Royal Naval Air Service :—

The Distinguished Service Cross.

Flt. Lt. (Actg. Flt. Comdr.) C. B. Ridley, R.N.A.S.

For distinguished services as a pilot and for courage in low-flying expeditions during which he attacked enemy trenches with machine-gun fire from a height of 30 feet. On March 9th, 1918, he attacked a formation of enemy scouts, selecting one which was attacking one of our machines. The enemy aircraft dived down with a quantity of smoke issuing from it, but appeared to flatten out at 2,000 feet and disappeared in the mist. He has previously destroyed several enemy machines, and has at all times led his flight with great skill and courage.

Actg. Flt. Comdr. C. F. Brewerton, R.N.A.S., and Flt. Obsr. H. A. Furniss, R.N.A.S.

For skill and courage displayed by them in carrying out many long and valuable photographic reconnaissances over enemy territory, particularly over Ostende, on February 21st, 1918.

Flt. Lt. B. A. Millson, R.N.A.S.

For the skill and courage displayed by him in carrying out two successful bombing raids on Bruges Docks on the night of February 17th-18th, 1918. This officer has taken part in many night bombing raids.

Flt. Lt. J. de C. Paynter, R.N.A.S.

For good work performed by him during a bombing attack on Ostende Seaplane Base on March 3rd, 1918, carried out in spite of very adverse weather conditions. He has shown great zeal and courage as a fighting pilot, having destroyed several enemy machines, and been twice wounded in aerial combats.

Flt. Lt. F. G. Horstman, R.N.A.S.

For good services rendered in a bombing attack on Ostende Seaplane Base on March 3rd, 1918, when many direct hits were made. The raid was carried out in spite of very adverse weather conditions. He has also shown skill and courage as a fighting pilot during many engagements with the enemy.

Flt. Sub-Lt. M. H. Findlay, R.N.A.S.

For the courage and daring displayed by him as a pilot. On March 8th, 1918, whilst on patrol, he engaged an Albatros scout, firing effectively from very close range. The enemy aircraft went down completely out of control. He has also destroyed or driven down out of control many other enemy machines.

Flt. Sub-Lt. J. M. Mason, R.N.A.S.

For consistently good work performed in the course of numerous bombing raids on enemy aerodromes. On Feb. 18th, 1918, he obtained a direct hit on a shed of the Varssenaere Aerodrome. On the return journey, during a fight with enemy aircraft, his control wire was shot away, but he succeeded in safely landing his machine.



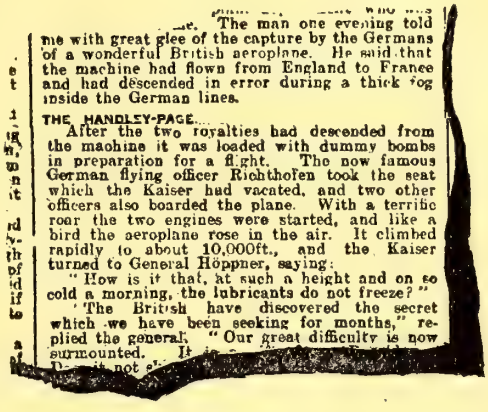
A British Firm beats the Germans



KAISER (loq.): "How is it at such a height on so cold a morning the lubricants do not freeze."

GEN. HÖPPNER: "The British have discovered the secret which we have been seeking for months."

Vide "DAILY MAIL," see above.



The man one evening told me with great glee of the capture by the Germans of a wonderful British aeroplane. He said that the machine had flown from England to France and had descended in error during a thick fog inside the German lines.

THE HANDLEY-PAGE.

After the two royalties had descended from the machine it was loaded with dummy bombs in preparation for a flight. The now famous German flying officer Richthofen took the seat which the Kaiser had vacated, and two other officers also boarded the plane. With a terrific roar the two engines were started, and like a bird the aeroplane rose in the air. It climbed rapidly to about 10,000ft., and the Kaiser turned to General Höppner, saying:

"How is it that, at such a height and on so cold a morning, the lubricants do not freeze?"

'The British have discovered the secret which we have been seeking for months," replied the general. "Our great difficulty is now surmounted. It is [illegible] not s[illegible]

Extract from "Life in Essen."
Eye-Witness's Account, "Daily Mail," April 8/18.

THE SECRET.

WAKEFIELD Castrol MOTOR OIL "R" (Racing)

was the lubricant used

Castrol "R" possesses the lowest cold test of any known Aero Engine Oil.

C. C. WAKEFIELD & Co., LTD.
WAKEFIELD HOUSE, CHEAPSIDE, LONDON, E.C. 2.

C.D.C.

Flt. Sub-Lt. T. A. Warne-Browne, R.N.A.S., and Obsr. Sub-Lt. T. S. Russell, R.N.A.S.

For the skill and determination displayed by them on March 18th, 1918, when carrying out a reconnaissance over Bruges and Blankenberghe under heavy anti-aircraft fire. Both these officers have taken part in many reconnaissances over the enemy's lines, often in face of heavy anti-aircraft fire and attacks by hostile aircraft, and have always displayed great gallantry and determination.

Obsr. Sub-Lt. F. H. Stringer, R.N.A.S.

For the zeal and ability shown by him as observer in many daylight bombing attacks over enemy territory, especially on Feb. 26th, 1918, when a direct hit was made on Engel Dump.

Bar to the Distinguished Service Cross

Flt. Comdr. C. H. Darley, D.S.C., R.N.A.S.

For zeal and determination in carrying out numerous night bombing raids on enemy aerodromes, docks, etc. On the night of Feb. 18th-19th, 1918, he carried out two attacks on the St. Denis Westrem Aerodrome.

Flt. Lt. V. E. Sieveking, D.S.C., R.N.A.S.

For the skill and determination in attacking enemy aerodromes, docks, etc., with bombs. On the night of Feb. 17th-18th, 1918, he carried out two bombing attacks on Bruges Docks, and on the following night he again carried out two attacks, one on St. Denis Westrem Aerodrome and one on Bruges Docks. His zeal and determination cannot be too highly praised.

Flt. Lt. S. W. Rosevear, D.S.C., R.N.A.S.

For the skill and gallantry displayed by him on March 15th, 1918, when he attacked a formation of eight enemy aircraft, destroying two of the enemy machines. This officer has destroyed numerous enemy machines, and is a very skilful and dashing fighting pilot.

A Second Bar to the Distinguished Service Cross.

Actg. Flt. Comdr. R. P. Minifie, D.S.C., R.N.A.S.

For courage and daring in the face of the enemy, particularly on March 13th, 1918. On that date, when on patrol with four machines, he attacked an enemy patrol of five scouts, destroying two, whilst a third was destroyed by another officer. Actg. Flt. Comdr. Minifie has now destroyed numerous hostile machines.

The Distinguished Service Medal.

P.O. A. Clark, O.N. 234540 (Po.); Air Mech., 1st Gr., W. Taylor, O.N. F14/6.

* * *

The following decorations have been conferred by the Allied Powers on officers of the British Naval Forces for distinguished services rendered during the war. The King has given unrestricted permission to the officers concerned to wear the decorations in question :—

Conferred by the President of the French Republic.

The Croix de Guerre.

Wing-Comdr. C. H. K. Edmonds, D.S.O., R.N.A.S

Sqdn.-Comdr. C. W. H. Pulford, R.N.A.S.

Conferred by the King of the Hellenes.

The Order of the Redeemer.

Commander.

Sqdn. Comdr. R. J. Bone, D.S.O., R.N.A.S.

War Office, April 17th.

REGULAR FORCES—Staff—Attached to Headquarter Units.—Brig. Maj.—Lt. (temp. Capt.) T. M. Eggan, Lond. R., T.F., and R.F.C., to remain secd., and to retain his temp. rank while so empld. (March 1st).

Staff Capt.—Temp. Maj. the Rt. Hon. Sir J. A. Simon, K.C.V.O., relinquishes his appt. (Jan. 29th).

Establishments.—R.F.C.—Mil. Wing. — Special Appt.—Graded as a Sqdn. Comdr.—Lt. (temp. Capt.) E. Selby, Spec. Res., a Flt. Comdr., and to be temp. Maj. while so empld. (March 20th).

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.—Temp. Sec. Lt. E. T. Simpson, Gen. List (March 24th); temp. Sec. Lt. H. N. C. Robinson, Gen. List (March 28th).

Adjt.—Temp. Maj. E. W. H. Kennedy, Garr. Bn., Hamps. R., and to be transfd. to R.F.C. Gen. List (Dec. 6th, 1917).

Equipt. Officers, 1st Cl.—Sec. Lt. (temp. Capt.) C. Porri, Yeo., T.F., from an Experimental Officer, 1st Cl. (graded as an Equipt. Officer, 1st Cl.), and to retain his temp. rank while so empld. (March 6th, seny. Oct. 1st, 1916).

Schools of Instrn.—School of Photography.—Comdt.—Graded as a Park Comdr.—Lt. (temp. Capt.) P. R. Burchall, Spec. Res., an Equipt. Officer, 1st Cl., and to be temp. Maj. while so empld. (March 10th).

Memoranda.—To be temp. Lts. (without the pay or allowances of that rank) while empld. as Asst. Insprs., Aeronautical Inspn. Dept.—Temp. Sec. Lt. N. Lee (Nov. 5th, 1917); Sec. Lt. A. E. Joyce, Res. of Officers (Nov. 15th, 1917).

War Office, April 18th.

REGULAR FORCES—Memoranda.—To be temp. Hon. Lt.:—Cpl. B. C. Hawkridge, from R.F.C., while empld. as Asst. Inspr., Dept. of Aircraft Production, Nov. 1st, 1917.

* * *

The following Medals have been awarded by the President of the French Republic at various dates to the British Forces for distinguished services rendered during the course of the campaign. The King has given unrestricted permission in all cases to wear the Medals in question :—

Croix de Guerre.

Maj. (temp. Brig.-Gen.) J. H. W. Becke, D.S.O., Notts and Derby R.; Temp. Lt. A. F. Britton, M.C., R.F.C.

Bt. Lt.-Col. (temp. Lt.-Col.) G. W. P. Dawes, D.S.O., R. Berks R. and R.F.C.

Lt. A. D. Ferguson, High. L.I., Spec. Res., and R.F.C.

Capt. (temp. Maj.) J. H. Herring, D.S.O., M.C., R.F.C., Spec. Res.

Capt. W. R. Kempson, R.F.A. and R.F.C.

Lt. (temp. Lt.-Col.) A. C. Maund, Canadian Contingent and R.F.C.; Capt. V. Millard, Essex R., Spec. Res. and R.F.C.

Lt. L. H. Pakenham-Walsh, Ches. R. and R.F.C.

Sec. Lt. (temp. Lt.) J. H. Secker, R.F.C., Spec. Res.; Temp. Capt. S. B. Smith, M.C., R.F.C.

Capt. C. W. Wise, M.C., A.S.C., Spec. Res., and R.F.C.

Temp. Capt. B. E. Baker, M.C., Gen. List and R.F.C.; Lt. (temp. Capt.) G. B. A. Baker, M.C., R. Berks R. and R.F.C.

Lt. (temp. Capt.) R. M. Charley, M.C., R.F.C. (Spec. Res.).

Temp. Capt. H. M. Ferreira, Gen. List and R.F.C.

Lt. (temp. Capt.) C. H. Gardner, R.F.A. and R.F.C.; Temp. Lt. H. S. Goodliffe, Gen. List and R.F.C.

Sec. Lt. (temp. Capt.) H. B. T. Hawkins, R.F.C. (Spec. Res.).

Capt. C. Mackay, M.C., Lein. R., Spec. Res., and R.F.C.; Lt. (temp. Capt.) F. J. Morse, K.R.R.C. and R.F.C.

Temp. Maj. M. H. B. Nethersole, Gen. List and R.F.C.

Sec. Lt. (temp. Capt.) K. R. Park, M.C., R.A., and R.F.C.; Lt. (temp. Capt.) A. D. Pryor, Cambs. R. and R.F.C.

Sec. Lt. (temp. Capt.) T. E. Salt, R. War. R. and R.F.C.

Temp. Capt. H. Turner, Gen. List and R.F.C.

Maj. A. A. Walser, M.C., Lond. R. and R.F.C.

War Office, April 19th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers :—Capt. R. H. Rusby, Glouc. R., T.F., March 26th; and to be temp. Capts. while so empld. :—Temp. Lt. H. M. Gibbs, Gen. List, March 24th; Temp. Sec. Lt. D. H. Chamberlain, Gen. List, March 27th; Temp. Sec. Lt. E. J. Smetham-Jones, Gen. List, March 28th; Temp. Sec. Lt. C. A. Lewis, Gen. List, March 31st.

Instrs. in Gunnery—(Graded as Equipt. Officers, 1st Cl.)—From Asst. Instrs. in Gunnery—(Grade as Equipt. Officers, 2nd Cl.) :—Temp. Capt. W. G. Millar, Gen. List, March 18th; and to be temp. Capts. while so empld. :—Temp. Lt. P. Middlemas, Gen. List; Lt. A. W. Sutton, Durham L.I., T.F.; Temp. Sec. Lt. G. B. Neale, Gen. List; Lt. F. A. Swoffer. Middx. R., T.F., March 18th.

Balloon Co. Comdr.—(Graded as a Flt. Comdr.).—Temp. Lt. O. H. Weekes, A.S.C., from a Balloon Comdr. (graded as a Balloon Officer), and to be temp. Capt. while so empld., Dec. 11th, 1917.

Equipt. Officers, 1st Cl.—Lt. J. H. Robertson, Spec. Res., from the 2nd Cl., and to be temp. Capt. while so empld., March 23rd.

Gen. List.—To be temp. Sec. Lts. :—3rd Cl. Air Mech. A. McD. Stevenson, from R.F.C.; 3rd Cl. Air Mech. C. Hall, from R.F.C., Jan. 25th.

Air Ministry, April 19th.

R.A.F.—F. H. Sykes, C.M.G. (Bt. Lt.-Col., temp. Brig.-Gen. in Army), to be Chief of Air Staff, and is graded a commn. as Maj.-Gen., April 12th.

Col. (temp. Maj.-Gen.) J. M. Salmond, C.M.G., D.S.O., to be Maj.-Gen., April 2nd.

Flying Branch.—Maj. (temp. Lt.-Col.) R. R. Smith-Barry, to be Col., April 17th.

Lts. to be temp. Capts. while empld. as Capts. (Flying) :—R. T. Fagan, April 2nd; C. G. D Napier, J. D. Hewitt, (Hon. Capt.) J. Gamon, April 4th; D. R. Maclaren, April 6th; J. E. Hibbert, M.C., H. B. Pett, April 9th; A. E. Palfreyman, April 12th.

Administrative Branch.—To be temp. Majs. while empld. as Admin. Majs. :—Capt. K. D. Abercromby, Capt. L. Newman, Lt. (temp. Capt.) J. Inwood, April 1st.

Lt. J. Rickie to be temp. Capt. while empld. as Admin. Capt., April 17th.

Sec. Lts. to be temp. Lts. while empld. as Admin. Lts. :—G. Hewlett, W. Burrows, E. P. Spriggs, L. E. Carter, April 1st.

War Office, April 20th.

REGULAR FORCES.—Establishments.—Asst. Instrs. in Gunnery.—(Graded as Equipt. Officers, 2nd Cl.).—From Asst. Instrs. in Gunnery (graded as Equipt. Officers, 3rd Cl.) :—

(Continued on page 1547.)

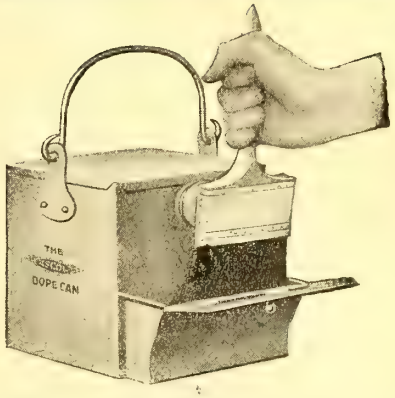
ASCOL Specialities.

TRADE MARK
ASCOL
REGISTERED.



SCREW DRIVERS.

Size	Per doz.
6in.	8/9
8in.	13/-
10in.	16/6



Showing Brush being strained ready for use.

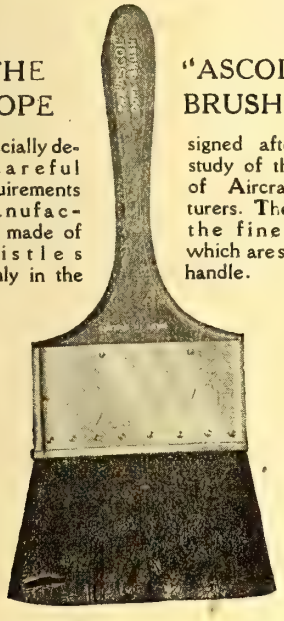
THE "ASCOL" DOPE CAN.
Regd. Design **663563.**

THE DOPE

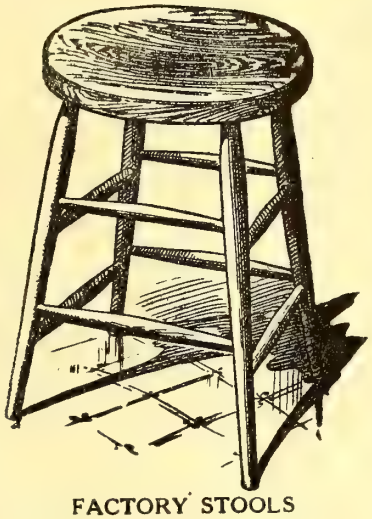
Specially de- a careful requirements Manufac- are made of bristles firmly in the

"ASCOL" BRUSH:

signed after study of the of Aircraft turers. They the finest which are set handle.



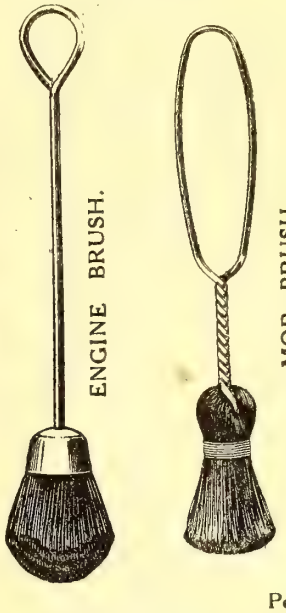
Size.	Each
2in (Aluminium bound) ..	2/6
2in (Tin bound)	2/5
3in. „ „	3/9
4in. „ „	5/-



FACTORY STOOLS
(Wood).

24in. high - **6/6** each.

BRUSHES.



	Per doz.
Scratch Brush (4-row) ..	16/-
Engine Brush, 10 in. (Fibre)	8/6
„ „ „ (Hair)	9/6
Mop (Sud)	4/2

Write for a Copy of "Aircraft Supplies."
Our Fortnightly House Journal.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.
Head Offices, Showrooms, and Stores:
ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.
Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

G. H. MANSFIELD,
Managing Director.

Telephone:
GERRARD ... ... 276.
Private Branch Exchange.

Telegrams:
"UPCAST, RAND,"
LONDON.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

MEERLOO

WE beg to announce that, owing to the extension of our works, and in order to accommodate additional machinery to facilitate the manufacture of

A.G.S. Parts,

we have moved our Head Offices to

199, PICCADILLY, W.1

Telephone: REGENT 1394.

where all communications in future should be addressed.

THE MEERLOO ENGINEERING CO LTD

—AERONAUTICAL ENGINEERS.—
CONTRACTORS TO THE AIR BOARD.

FOREST LANE, STRATFORD, LONDON, E.15.

Managing Director—
JOHN MEERLOO, Junr.

Phone—Stratford 973.
Wires—"Aeromeecol," Phone, London.

SBAC — The Society of British Aircraft Constructors

AIRCRAFT MANUFACTURING COMPANY——————LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

Offices & Works
HENDON, N.W.9.

" " CONTRACTORS TO " "
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge Motor Factory
WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—IV.

BY C. SYLVESTER.
Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Cylinder Design.

The cylinder, cylinder head, and the piston are the three portions of an engine that are subjected to combustion pressure and very severe heat stresses at the same time. It is therefore essential that considerable care should be expended on these important parts.

Before commencing the design it must be realised that the cylinder must be capable of withstanding the strains due to:—

1. Stresses due to the variation in the temperature of the combustion in the cylinder head, and the cooling water outside the cylinder walls.
2. The enormous stresses due to the pressure of the combustion of the working fluids.
3. All stresses which emanate from the load on the piston and which are transmitted from the cylinder head to the base of the engine, either direct through the cylinder itself or by means of studs fixed from the cylinder head to the base.

Of the above, the first item is the most important, but it may safely be said that there is no known method of calculating the stresses due to the rapid transmission of heat. The most efficient design of cylinder has only been arrived at through practical experience.

Types of Cylinders.

There are several types of cylinders in use at the present time, each varying from the other in design and construction.

Air-cooled cylinders usually have the cylinder and head cast in one piece.

Some types of water-cooled engines have the cylinder, cylinder head, and water jacket in two castings, the cylinder and head forming one casting.

The latest types of aero-engine have cylinders, water jackets, and cylinder heads in three independent portions. In these the cylinder proper is a cast-iron or steel sleeve to take the piston-wear fitted inside a jacket of aluminium or other metal. Thus sleeve abuts on the cylinder head, or fits into it, as well as in the jacket casting.

Cylinder Sleeves.

The method of fixing the sleeve into the cylinder head is a matter of choice rather than design. Some sleeves are satisfactory if neatly fitted, others are screwed and are equally satisfactory.

If either method is adopted it must be remembered that the work must be absolutely accurate and sound; if it is not, then trouble will be the result due to the axial and radial stresses caused by the explosion which are shared by the cylinder jacket and the liner.

Points in Design.

Two points should be carefully observed when designing a cylinder.

1. Any abrupt variation in the thickness of the material should be avoided. A good example of this is the flange at the base of a cylinder sleeve, Fig 8. In this diagram one side of the base of a cylinder is shown in section. Here, A is good practice, B is not correct, C shows the actual section of a well-known type of cylinder. The material is steel.
2. Suitable allowances should be made for the unequal expansion and contraction of the cylinder and water jacket walls. In aero-engines this is much more simple than when dealing with a large power oil engine, where, in addition to mechanical strength, allowances have to be made for the subsequent boring of the cylinder. With aero-engines the factor of safety of the material can be approached with certainty, because the maximum thickness of the material is the minimum thickness, and vice versa.

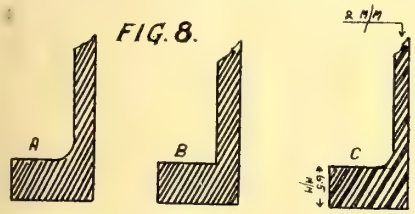


FIG. 8.

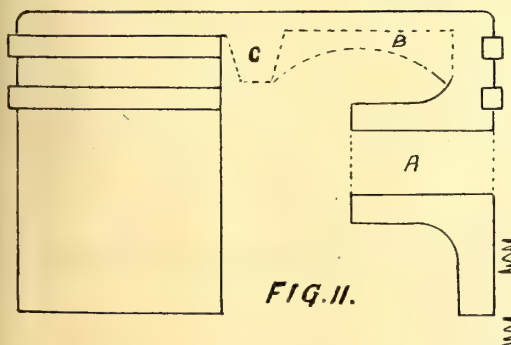


FIG. 11.

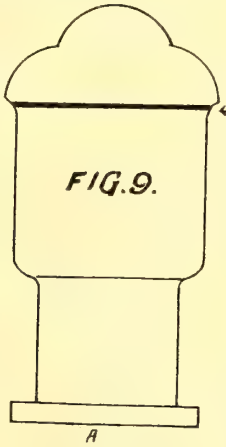


FIG. 9.

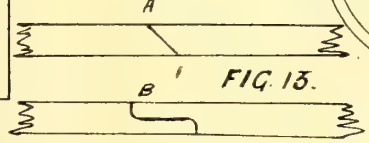


FIG. 13.

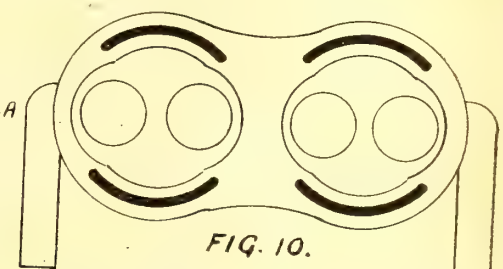
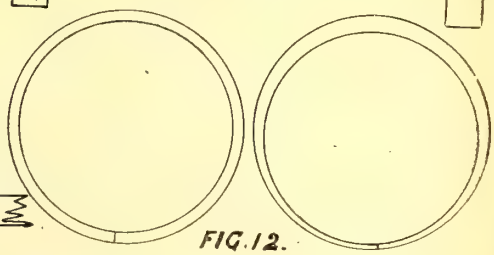


FIG. 10.


FIG. 12.

Modern Practice.

An illustration of the type of cylinder used in a modern engine of 140 B.H.P. aero-engine is shown in Fig. 9. This diagram shows one cylinder only of a recent American engine, but the cylinders are actually cast in pairs from an aluminium alloy, and they are provided with steel sleeves carefully fitted into each cylinder. Perfect contact is secured between the cylinder and sleeve.

No difficulties due to expansion occur in spite of the rapid transmission of heat and the fact that the sleeve is always at a higher temperature than the jacket cylinder.

A moulded copper asbestos gasket, A, is placed between the cylinder and the head, thus permitting the cooling water to circulate freely and at the same time ensuring a tight joint.

The cylinder heads are also cast in pairs from an aluminium alloy, and they contain ample water-passages for the circulation of cooling water over the entire head. Trouble due to hot valves is thereby eliminated, a most important consideration in the operation of designing an aero-engine.

The water-jacket of the head corresponds to the water-jacket of the cylinder, and large openings in both allow the unobstructed circulation of the cooling water.

Fig. 10 illustrates the plan of the cylinder head. In this diagram the inlet and exhaust valves are shown. The thick curved lines indicate the inlet and outlet for the cooling water.

Piston Design.

The design of a piston depends upon the type and power of the engine in which it is to be used. Water-cooled pistons are extensively used in large power Diesel and oil engines. This method cannot be adopted for aero-engines, at any rate at present, so we will consider piston design from an aero-engine point of view only.

As with all aero-engine parts the minimum weight, combined with efficiency, is the first consideration. This being so, it is generally understood that aluminium, as an alloy with zinc, being very light and strong is a suitable material for the construction of pistons.

Experience has taught us that this alloy has given every satisfaction, but it must be pointed out that a designer is very apt to err both from an economical and efficiency point of view if he depends upon this alloy in every instance. By this it is meant that, although an aluminium alloy has proved to be satisfactory for the construction of a piston, there must be a sufficient quantity of this alloy used to give it the necessary mechanical strength.

A Personal Opinion.

In the writer's personal opinion, it would probably be cheaper, quite as efficient, and the weight would not be increased if a metal or alloy other than aluminium were used

This appears to be the opinion also of the Beardmore Aero Engine Co., Ltd., who make the pistons in their engines of special steel. Owing to its great toughness they are extraordinarily light, the wall being only 1 mm. thick.

The Other View.

The American engine mentioned is fitted with pistons made from a special aluminium alloy. They are deeply ribbed in the head for cooling and strength, and they are provided with two piston rings. Such a piston is illustrated in Fig. 11.

In this diagram A is one of the gudgeon-pin bearings, B is one of the ribs, and C is the cross section of the rib which crosses B at right angles.

Piston Lengths.

The length of a piston chiefly depends upon the thrust of the connecting rod at right angles to the centre line of the piston. It is fairly safe to assume, however, that if twice the distance from the centre of the gudgeon-pin to the top of the piston be allowed for total length, the design is correct. That is, if the distance from the centre of the pin to the top of the piston is two inches, then the total length will be four inches.

To give the student a good idea of an excellent design of piston, I quote the piston details of a well-known water-cooled aero engine.

Diameter of piston at top	... ...	141.2 mm.
Maximum clearance in cylinder	... ...	.035 in.
Minimum clearance in cylinder	... ...	.029 in.
Diameter of piston at bottom	... ...	141.6 mm.
Maximum clearance in cylinder	... ...	.018 in.
Minimum clearance in cylinder	... ...	.014 in.

From the above details it will be seen that both the clearances and limits are very fine.

Piston Ring Design.

The design and manufacture of piston rings is a highly specialised branch of motor engineering. A perfect piston ring is one that has a high tensile strength, and a high elasticity which will give it a maximum life and springiness without fear of breakage through brittleness.

Care should be taken that the composition of the material used should contain the proper combination of elements to give a minimum permanent set, wear, or deterioration in any way under cylinder heat. Thus the casting temperatures should be determined by pyrometer, the hygroscopic nature of the sand, and the rate of cooling noted as affecting chill, and so on.

Concentric Rings.

The advantage the concentric type of ring possesses over the eccentric type is that, being of similar cross section all round, there is no tendency to wear the grooves unevenly, neither is there a space behind the ring for the deposition of carbon.

One of the chief difficulties in the construction of concentric rings is to obtain a uniform pressure all round when they are in position in the cylinder. The British Chuck and Piston Ring Company guarantee to produce rings that are a perfect fit, this being facilitated by the use of special automatic hammering machines which give the ring the necessary curve.

In Fig 12 are illustrated both concentric and eccentric rings.

Gap and Pressure.

A perfectly constructed piston ring should have just sufficient spring to make a perfectly gas-tight joint against the pressure of the explosive gases in the cylinder. This spring, or the combined pressure of the rings in the cylinder, should be the minimum required for gas tightness, since friction is roughly proportional to the pressure.

As far as aero-engines are concerned, the number of rings to be used depend upon the type of engine and the area of the cylinder. It is sometimes better to use, say, four rings of fair pressure than two rings which will give high pressure and excessive wear of the cylinder walls.

In aero-engines the average pressure of a ring on a cylinder wall is about 18lbs. per square inch. The ring should be constructed, as far as weight and cross section is concerned, to maintain this pressure without producing undue stresses in the ring.

In some types of engine extra high pressure of the ring on the cylinder wall is essential. In this case it is apparent that the adoption of a cast-iron ring would not be satisfactory, since it is not possible to obtain more than 18 tons per square inch tensile. A ring is therefore used which is manufactured from high speed steel, which has about three times the modulus of elasticity of cast iron. That is to say, a cast-iron ring with dimensions identical to such a steel ring would exert but one third the pressure on the cylinder walls, as compared with the steel piston ring.

Ring Joints.

Many designs are brought forward from time to time concerning this important subject, but one is of the opinion that it is not so much the design of the joint as the actual fitting that ensures efficiency. Leakage, past any pattern joint, if well fitted, is negligible.

For our purpose in this article we will consider two pattern joints only. One is known as the "scarf," the other as the "lap." These joints are illustrated in Fig. 13 where A is the scarf and B the lap joint. Special attention is drawn to B, where the lap should be as short as possible and radii left in corner for strength.

(To be continued.)

WOMEN PILOTS.

The following advertisement appeared recently:—

Ladies' Flying School.—Those interested in this and with capital of not less than £500 to £1,000 are invited to write to Box L.569, the "Times."

It is to be hoped that any readers of this paper who are asked to advise on this proposition will advise against it. No doubt in time to come women aviators will be numerous, but in war time there is no place for them. All available aerodrome space, engines, aeroplanes, mechanics, and petrol are required for the training of war pilots.

It has been suggested that women would be useful as "ferry pilots" to take Service machines from place to place in Great Britain or behind the lines in France. There is, in fact, no need for them. There are plenty of war-worn pilots who are fit for the job and for very little else. These men have already been trained to fly at great expense, so there is no reason to spend more money on training women for the same work. The fact that the advertisement asks for capital in such small amounts as £500 lots seems to indicate that the scheme is financially unsound at the very start, and anyone who may be asked to participate in it will be well advised to give it a wide berth.

THE AERIAL POST.

In response to inquiries the Postmaster-General states that it is not proposed to establish an experimental postal aerial service in this country at present, as the whole resources of the aeroplane industry are required for military purposes.

[It is rather a pity that some of the perfectly usable aeroplanes, which are just too out-of-date for military work, cannot be used for the experiment. At present there are hundreds of them rotting in stores all over the country, and they will ultimately have to be burned. They might just as well be used now.—Ed.]

MANN EGERTON & Co.Ltd.

Contractors to the Admiralty, H.M. War Office, Etc.

ELECTRICAL

POWER AND LIGHTING

SPECIALISTS

ENGINES, DYNAMOS, MOTORS, SWITCHBOARDS, CABLES, LAMPS, ETC.

FOR MUNITION FACTORIES

SUPPLIED & ERECTED AT SHORTEST NOTICE.

MANN EGERTON & Co.Ltd.

177, CLEVELAND ST., LONDON, W.1.
ALSO AT NORWICH AND IPSWICH.

The Curtiss Flying Boat Patent.

Considerable importance attaches to the patent on flying boats recently granted to Mr. Glenn H. Curtiss. Many other designers of flying boats will, in due course, arrive at the same conclusions as Mr. Curtiss, and it will therefore be as well for them to study the following particulars carefully, so as to avoid infringements.

There is a certain interest concerning this boat, as it is obviously the result of the experiments made, along with Mr. Curtiss, by Lieut. John Porte, R.N., before the war. It is fair to assume that it was for services thus rendered that Mr. Curtiss gave Lieut. Porte that interest in the consequent sales of these boats, which entailed his coming into so much money as the result of the boat's success that the British Government became covetous, and compelled him by legal pressure to "return" to the Treasury some thousands of pounds which never belonged to it.

The patent reads as follows :—

The United States Patent Office granted on February 19th, 1918, the claims made in an application filed on December 11th, 1914, by Mr. Glenn H. Curtiss, of Hammondsport, N.Y., in behalf of a patent covering the construction of stepped and V-bottomed flying boat hulls. The patent, No. 1,256,878, is specified by the patentee as follows :—

My invention relates to hydroplane boats of the type commonly used in connection with hydro-aeroplanes of the flying boat type. It has for its objects the enabling of the craft to rise quickly from the water with maximum load aboard and having risen from the water to enable operation in the air with a minimum of head resistance due to the body of the boat. To these ends the main flotation body of the boat is given a longitudinal section of approximately streamline form, and a transverse section increasing in size from the head of the boat to a maximum approximately one-third length astern, and thereafter gradually decreasing in cross section until the tail of the boat is reached. This cross section is approximately the shape of an ellipse with one or both ends or sides cut off to form the bottom of the boat, or the top thereof, as the case may be. Further I decrease the minor axis of the ellipse more rapidly than the major axis as the cross section is decreased in the immediate vicinity of the tail of the boat, so that the section becomes substantially a straight line terminating in the vertical rudder post. Previous to this, the separate axes are independently varied in the rearward progression of adjacent cross sections, to obtain the streamlines with which the boat is characterised, and to bring out to the fullest extent the features of efficiency above enumerated. The bottom of the boat is stepped and the front portion thereof constitutes the active hydroplaning surfaces,

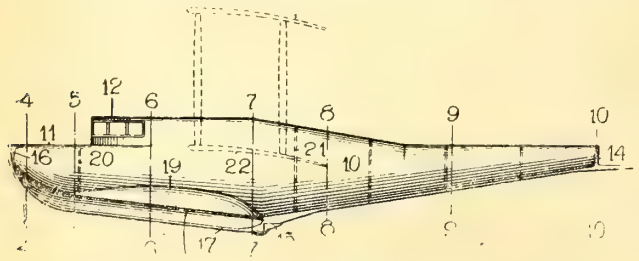


Fig. 1.

while the rear portion thereof underlying the tail proper makes a salient angle therewith. Preferably the hydroplaning bottom is V-shaped. On the sides of the boat are formed excrescent structures the bottoms of which are in continuation of the hydroplaning bottom of the boat, and the longitudinal section of which is of streamline form. Preferably these excrescent structures are watertight, and are of an approximately triangular section.

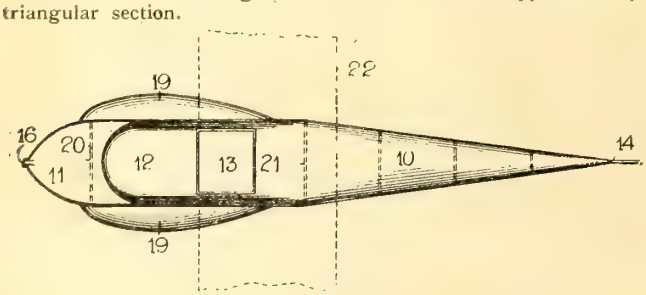


Fig. 2.

In the accompanying drawings, I show one embodiment of my invention but wish it understood that, as usual in the case of an invention of this character, my invention is capable of many other embodiments without departing in any wise from its generic spirit.

Of the drawings Figure 1 is a side-elevation of the boat of my invention,

Fig. 2 is a plan thereof,

Fig. 3 is a front elevation thereof showing aerial supporting surfaces attached, and

Figs. 4 to 10 inclusive are transverse sections on lines 4 to 10 of Fig. 1.

10 designates the flotation body of the boat. As clearly indicated in the side elevation and plan of Figs. 1 and 2 this

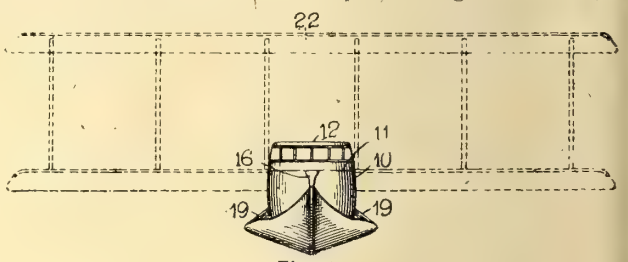


Fig. 3.

body has a longitudinal section approximately streamline in form. There are a few slight irregularities in its surface, but these are insufficient to detract from the behaviour of the boat in air as a streamline body. The principal variation is at the head or prow of the boat, where the top is cut straight back on the line 11 to form a front deck, and give unobstructed vision from the cabin 12. To complete the elevational streamline the cabin roof line would naturally be downwardly curved to round off into a substantially elliptical juncture with the nose. This forward elevational streamline, however, is interrupted by the provision of the fore deck 11 which extends horizontally and rearwardly to an intersection with the cabin, a cockpit being provided at the intersection of this deck with the cabin and a conning top having windows set therein being furnished to inclose this cockpit and to round off the interrupted lines of the cabin forwardly. The side and top walls of the cabin merge into the streamline of the body aft as indicated in Fig. 1. Entrance to the cabin is by a hatch door 13 in the top and preferably located beneath the upper aerial supporting surface whereby it is shielded from the weather.

The transverse section of the body of the boat is in the form of an ellipse cut away in some cases at opposite ends of an axis and in other cases at one end only. The section at the front of the boat, as clearly shown in Figs. 4 to 7, is in the form of an ellipse cut away at each end of an axis, while the section at the tail of the boat as shown in Figs. 8 to 10 is in the form of an ellipse cut away at lower end of one axis only. In the form shown this axis is the major axis, all of the major axes lying in the longitudinal vertical plane of the body. The cross section increases gradually to a maximum approximately one-third way astern, and thereafter decreases gradually. Both axes decrease proportionately for a part of the rearward distance traversed, then the major axis is shortened at the more rapid rate and finally the decrease of the

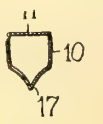


Fig 4

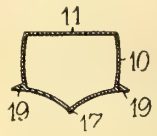


Fig 5

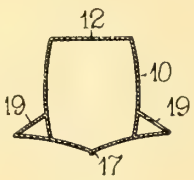


Fig 6

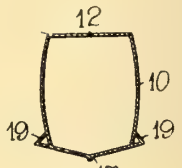


Fig. 7

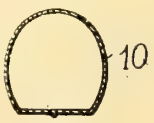


Fig. 8

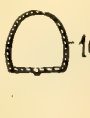


Fig 9



Fig. 10

minor axis of the elliptical section is made more rapidly than that of the major axis. These three successive stages clearly appear from inspection and comparison of Figs. 7-8, Figs. 8-9 and Figs. 9-10 respectively, the elliptical section eventually becoming a straight line in the rudder post 14. In other words the transverse section may be described as varyingly elliptical,

Firth's
"Speedicut" High-Speed Steel
For turning Tools.

"Speedicut" Milling Cutters
and Drills
For all workshop purposes.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

the size of the ellipse (rearwardly from the prow) passing through successive stages in which (a) the major axis increases rearwardly more rapidly than the minor axis (b) both axes decreasing rearwardly, and (c) the minor axis decreases at a more rapid rate than the major axis, the said sectional ellipses terminating in a straight line at the rudder post.

The bottom of the boat is stepped as indicated at 15 (Fig. 1). The front portion thereof is of V section the angularity of which increases gradually from the stem 16 to the step 15 as indicated clearly in Figs. 4 to 7. Also it will be observed there is an abruptly increasing and then a gradually decreasing concavity of the opposite sides of the V-bottom merging into the substantially flat salient surfaces at the step 15. It will be observed, however, that this concavity is not great in any case, and further that the downward and rearward inclination of the bottom at the keel 17 is substantially the same as that at the chimes 18, excepting at the upwardly inclined prow of the boat which portion of course has no hydroplaning function.

Projecting laterally from the sides of the flotation body 10 at or near the chine lines 18 are elongated excrescent structures 19. These structures have an approximately streamline form as clearly appears from Figs. 1 and 2. Transversely they are of approximately triangular and varying cross section, one side of the said section being in continuation of the transverse section of the bottom of the boat (see Figs. 6 and 7), whereby their under surfaces constitute continuations of the main hydroplaning surfaces, another side conjoining the sides of the main body 10, and the third side extending downwardly and laterally therefrom. Considering the conjoint sides of the hull and fin excrescences as identical, as is usually the preferable construction, it will be observed that the fins in cross section then become of an acute V-shape, one side of the V lying in the plane of the bottom and the other side intersecting therewith from the hull. These excrescent structures 19 are made watertight independently of the main body 10 and in the embodiment shown are each hermetically sealed. The two structures 19 and the front portion of the main body 10 make a total of three longitudinally extending watertight compartments. The front portion of the main body 10 is further transversely subdivided into watertight compartments as indicated by the dotted line bulkhead 20. The tail portion of the boat is also divided into watertight compartments by transversely extending bulkheads 21.

Aerial supporting surfaces 22 extend laterally from the body 10 as indicated. In the preferred form of my invention, there are provided a multiple number of these surfaces in superposed relation constituting the cell of a biplane or triplane as the case may be.

The fins 18, it will be observed, extend considerably beyond the centre of the wings and therefore the hydroplaning area and lift is augmented in the neighbourhood of the centre of gravity and centre of pressure as it should be. This location of the fins 18, although most effective after having gained the surface of the water, is of little importance in gaining this end. More important is it that the fins should be located in the vicinity of the resultant centre of hydroplane lift so that the hydroplane lift will be increased at the point where it is most needed to be increased and at a point providing for quick rise from a submerged position at rest to a hydroplaning position upon the surface of the water at speed. The great advantage in so locating the fins is that the enormous thrust value occasioned by the elevated location of the motor or motors (not shown) is offset and the boat prevented from nosing under when coming to a hydroplaning position and when hydroplaning —especially when travelling at comparatively slow speed. In explanation, it is to be noted that three working forces are in evidence, to wit: gravity, thrust and hydroplane lift. Unless the hydroplane lift is sufficient to counteract the force of thrust, then the boat will have a tendency to plane with its nose low in the water. Were the fin excrescences omitted, the size of the fore body of the hull would have to be materially increased so that the hydroplaning area might be proportionately enlarged. This is objectionable because of the added weight and increased resistance during flight. The resultant centre of hydroplane lift is shown by calculation to lie approximately one-third back of the forward end of the hydroplaning surface.

With this understanding of the structural embodiment of my invention, it will be clear that I have attained the objects thereof. The extended and very large hydroplaning surfaces provided by the bottoms of the excrescent structure 19 in conjunction with the main body 10 are of sufficient size to enable the body to come rapidly to its hydroplaning position, and to rise from that position into the air with maximum load. In a recent trial, over a ton of useful load was lifted from the water in a run upon the surface not exceeding five hundred feet. The flying boat took to the air with great ease. As the head of the boat is pointed upwardly for the craft to take to the air, the tail, which until then is clear or substantially clear of the water, is carried downwardly into contact therewith, the boat being as it were rocked about the step 15 as a pivot. This assists in enabling the boat to rise easily from the surface of the water by reason of the increased flotation and additional planning surface provided at the critical point in the operation. When the craft is in the air, the longitudinal streamline formation of the excrescences 18 prevents them from materially increasing the head resistance of the boat. Under actual flying conditions it was found that they produced no noticeable retarding effect. Of course the longitudinal streamline section of the body as a whole is productive of the same excellent results obtained in prior flying boats of my invention.

While on the surface of the water, or in the air for that matter, the operator has an excellent footing on the flat deck 11 and its form and location are especially adapted for the mounting and operation of machine guns for military purposes. The operator further has at all times unobstructed vision ahead directly over the flat deck 11, which forwardly mutilates the generating boat line of the cabin which would normally round off into the nose of the body.

The sealing of the excrescent structures 18 independently of the main body 10 gives to them the additional and very important function of watertight compartments. They are located at a point where these compartments are very much needed, directly opposite the cabin 12. It is of course not practicable to seal the cabin section. The flotation of this section of the boat is thereby materially raised and is assuredly of sufficient value under all conditions of service.

[The Claims mentioned will be published next week.—Ed.]

"RESEARCH"—A FOOTNOTE.

I am glad to see that my recent articles in The Aeroplane on the subject of joint research seem to have attracted some attention, but I am sorry to have to admit that, judging by letters that I have received, my intentions in writing the articles in question were not made sufficiently plain.

What I was trying to advocate was not merely joint research by a group of inventors financed, let us say, by a syndicate and intending to make their results the subjects of patents out of which they and they alone would benefit.

What I hope to see is a Research Association comprising every firm worth mentioning in the Aircraft Industry and producing results which should be open to every member of that Industry to utilise to the best advantage without licence or payment of royalty.

This is the way to get the biggest result for the British Industry as a whole for any given expenditure of money. If an invention is devised by one man who possesses the sole rights in it, then its general utility is only one-fiftieth of what it would be if the same invention and all that led up to it were open and free to fifty firms.

On the score of cost, we have also to remember that real joint research by industries will be largely financed by the Government, whereas private syndicates will have to stand all their own costs. Some of the people who have written to me seem to pooh-pooh the idea of Government help. Perhaps because it seems to be too good to be true. Perhaps because the schemes they themselves have in mind are such that no sane Government would assist them.

The fact remains that, subject to control by responsible manufacturers who will not waste their money on mad projects, the Government will really put up substantial funds to assist in the discovery of new inventions and improvements.

Broadly speaking, means of communication can be divided into two groups. One group comprises all the ideas that can be usefully applied in ordinary civil life and that may also be very valuable in war. These include railways, motor vehicles, ships, telegraphy, and so on.

The other class of communication is that which merely enables the man who possesses it to make himself felt upon the person of his enemy at a distance. The gun in its various forms is the most obvious example, but the class includes also more primitive weapons, such as the bow-and-arrow and sling.

Man, and particularly so-called civilised man, has the advantage over other animals merely in his possession and control of means of communication. He can get himself conveyed rapidly from point to point on land or water and through the air. He can shift his goods rapidly, and he can hit his enemy from a distance before his enemy can hit back.

At the present moment the fate of the aeroplane hangs in the balance. With which group of means of communication is it to be classed?

From the manufacturing point of view, will it mean a steadily growing industry on a firm foundation, or only a war industry for which large national arsenals must be mainly responsible?

What we have to do is to bring it into the first of these classes. It can be done by expenditure and enterprise, and we cannot be satisfied so long as it is not employed more extensively than the gun, which is the weapon of the soldier and the means of enjoyment of the sportsman.

We can make it far more useful, and the Nation that does so first will get the bulk of the world's business. That is why we want to throw up all schemes of research by syndicates and pool our money and our plans for research by the entire industry.

Diogenes.



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE,

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

"GWYNNE, LONDON."

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Gothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street Works, BIRMINGHAM.

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON

CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office and Works:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 46 7 4648 HAMPSTEAD.

Scottish Factory and Aerodrome:

ALLOA.

Cable and Telegraphic Address: "CAUDROPLAN, ALLOA." Phone: 52.

SELSDON

AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W. 1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO, CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.

W. CANNING & Co. Lustre Works, Gt. Hampton Street.

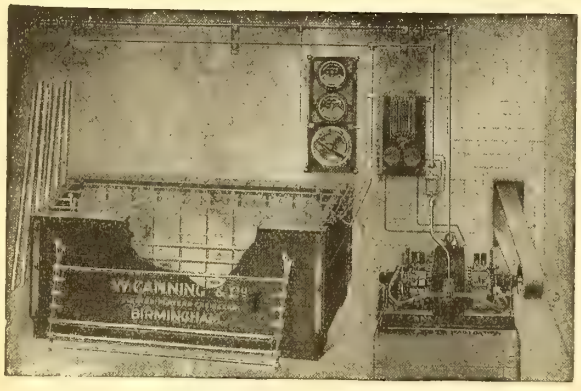
And 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

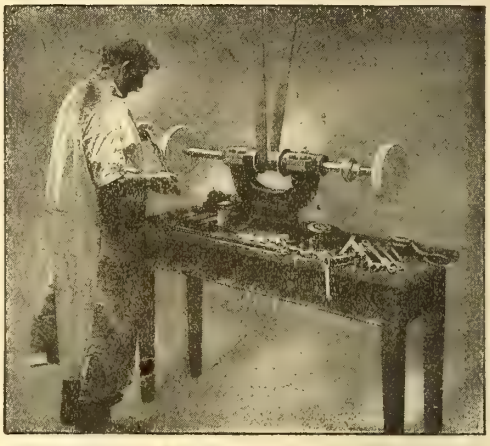


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

The "Guardian Angel" Parachutes

THE GUARDIAN ANGEL PARACHUTES TRADE MARK (REGISTERED)

THE CLASS OF OUR LIFE-SAVING EQUIPMENT.

The basic characteristics of our Parachutes, which differentiate them from all others, and for which we have master-patents, are automatic (i.e., compellative) opening, and static and kinetic control (i.e., control at rest and action) of all their component details. The ordinary parachute is under no sort of control, and what we have accomplished is to convert this most insubordinate Apache of the Air into a staid servitor, incapable of acting in any other than the designed way. We have made the Parachute into an automatic machine, so that failure to open and entanglement of rigging has become a physical impossiblity. Every Type of Parachute made by us possesses these paramount and indispensable principles of machine action. The aviator makes his jump, and the Parachute automatically does the rest.

THE RANGE OF OUR LIFE-SAVING EQUIPMENT.

Life-saving Parachutes for school machines on the Training Grounds.

Life-saving Parachutes for heavy bombing machines, fighters, and scouts.

Life-saving Parachutes with minimum weight and without additional air resistance for the fastest machine that flies, and capable of release from any vertical or horizontal angle, or when flying upside down.

Solo-Parachutes for use from Airships and Observation Balloons, with a high but constant-speed initial drop from a fired gas-bag, automatically opening into the low-speed descent required for a safe landing.

Basket-Parachutes for instantly detaching the basket containing two observers, their instruments and records, from a fired gas-bag, with high-speed initial fall, changing automatically to slow-speed descent for the safe landing. Parachute instantly released on landing, to avoid dragging the basket.

Variable-speed Parachutes, to permit a sudden high-speed drop, controlled by the Parachutist, to escape from an enemy aeroplane, and to stop on any portion of the grade of descent to avoid an objectionable landing. This variable-speed apparatus is applicable to the whole range of our Parachutes.

Non-spinning shock-absorber slings, taking all shocks off Parachute and man.

Aviator's Harness, distributing the stresses over those parts of the body best able to sustain them, and instantly releasable when alighting on land, on a roof, in a tree, or in water.

OUR EQUIPMENT IS THE RESULT OF ENGINEERING SCIENCE APPLIED TO DIFFICULT AIR PRORLEMS. WE BELIEVE THAT ITS EXTENDED USE WILL DOUBLE THE FLYING LIFE OF OUR FIGHTERS AT THE FRONT.

RELIABILITY—First. RELIABILITY—Second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S AERIAL PATENTS, LTD.

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines) London Wall 266 and 3267. Telegraphic and Cable Address: "Savemalivo-Ave-London."

H. & O., Ltd.

Harris & Others, Limited,

AIRCRAFT CONSTRUCTORS,

Old Town, Clapham, S.W.4.

Phone: "Battersea" 1238 1047

WOODWORK, METALS, COVERING AND DOPING.

Sub-Contractors to leading Aeroplane Builders.

On Admiralty and War Office Lists.



HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

HAMPSTEAD 7500 (9 lines).

CRICKLEWOOD,
LONDON. N.W.2.

"HYDROPHID, CRICKLE," LONDON

THE
GRAHAME-WHITE
AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Telegrams:
VOLPLANE, HYDE, LONDON.

Proprietors of the London Aerodrome
and
The GRAHAME-WHITE School of Flying.

Telephone:
Kingsbury 120 (5 lines).

To Works Managers and Buyers.——S.T.S.

SMALL TOOLS, Ex Stock.

PROMPT DELIVERIES.

Scroll Chucks.	High Speed Twist Drills	Milling Cutters.
Independent Chucks	Carbon Twist Drills.	Slitting Saws.
Drill Chucks.	Hand & Machine Reamers.	Taps and Dies.
Die Heads.	Centre Drills.	Shell Reamers.

Quick Grip and Parallel Bench Vices, Machine Vices, Hand Screwing Machines.

WE GIVE PERSONAL ATTENTION TO ALL ENQUIRIES.
AVAIL YOURSELVES OF OUR PURCHASING ORGANISATION.

THE SMALL TOOLS SUPPLY CO., LTD.

AVENUE CHAMBERS, SOUTHAMPTON ROW, LONDON, W.C.

Telegrams: "Prosait," West-Cent., London. 'Phone: 2655 Museum.

THE SUPER-AVIATION CO. LTD.

Aeronautical Designers, Constructors and General Engineers.

Manufacturers of Complete Machines and Spares.

CONTROLLED ESTABLISHMENT under the WAR MUNITION ACT.

HEAD OFFICE and WORKS:—

Dollis Hill Works, Duddenhill Lane, Willesden, N.W.10.

Telephone—WILLESDEN 642.
Telegrams—"SUPAVICOL," LONDON.

Managing Director—N. LEWIN, A.C. Mech. E.



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)

Dawson, John, & Co., Ltd., Victoria Works, Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 612.

Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd, Manchester, "Triplane, Manchester. City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.

Short Bros Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 704.

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London. Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships— Wimbledon 1314.

Airships, Ltd., High Street, Merton.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand & Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Willsey Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, 'Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61.

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1. Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (4 lines)

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728 "Aviduction, Phone, London."

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, I., & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4016.

The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Ajawb, London." London Wall 5359-3622

Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1293.

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3990.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085.

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Eleven London." Walthamstow 408 (2 l

Electrical Accessories—

Belling & Co., Derby Road Works, Mon Road, Upper Edmonton, N.18. "Be Edmonton." Tottenham

Johnson & Phillips, Ltd., Charlton, Lor S.E.7. "Juno, London." Central 2207, London Wall

Mann, Egerton & Co., Ltd., 177, Cleve Street, London, W.1. "Installing, road, London." Museum

Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. renheit, Birmingham." Midland

The Rotax Motor Accessories Co., Ltd., toria Road, Willesden Junction, N.W "Rodynalite, Phone, London."

Electric Cables— Willesden

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry

Johnson & Phillips, Ltd., Charlton, Lon S.E.7. "Juno, London." Central 2207, London Wall

Electric Lighting and Power

E. Stanley Fardon, A.M.I.E.E., 67, Mo Street, Manchester.

Johnson & Phillips, Ltd., Charlton, Lon S.E.7. "Juno, London." Central 2207, London Wall

Electro Platers and Metal Polishers' Engineers—

W. Canning & Co., 133-137, Great Hamp Street, Birmingham. "Materials, mingham." Birmingham 3622 Central (3 lin

Enamel—

Silico Enamel Co., New Cross, London,

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, don. S.W.1. "Edibrac, 'Phone, Londo 3540 Victoria (3 lin

Flexible Shafts—

Herbert Terry & Sons, Ltd., Reddi "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot lage, Bournemouth. "Etches, Winton." Bournemouth 11

Cambridge School of Flying and Aerodrome 308, St. Andrews St., Cambridge. bon, Cambridge." Cambridge 5 and 1

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavem House, London, E.C. London Wall 573 and 6

Galvanising—

Boulton & Paul, Ltd., Rose Lane Wo Norwich. "Aviation, Norwich." Norwich

Gauges—

J. A. Prestwich & Co., Northumberland Pa Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Asto Birmingham. "Mosgear, Birmingham."

Glue— East

Improved Liquid Glues Co., Ltd., Gt. Hern tage Street, E. (Croid.). "Exeroide Wapp, London." Avenue 3

Mendine Co., 8, Arthur Street, E.C. Bank 58

Oldroyd, Wm., & Sons, Ltd., 9, Mincing La

Goggles— E.C

Triplex Safety Glass Co., Ltd., 1, Albemar Street, Piccadilly, W.1. "Shatterlys, Picc London." Regent 134

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 6 Southwark Street, London, S.E.1. "Kinne London." Hop 372 (2 lines

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Co mercial Wharf, Lambeth, S.E. "Gabrie son, Watloo, London." Hop 7

Robert Young's Construction Co., Ltd., Cano bury Works, Canonbury Street, Essex Rd London, N.1

Instruments—

British Wright Co., Ltd., 33, Chancery Lan W.C.2. Holborn 130

Instruments (Scientific, Alt meters, etc.)—

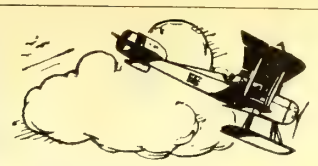
The Cambridge Scientific Instrument Co., Ltd Cambridge. "Instrument, Cambridge" Cambridge 64

Short & Mason, Ltd., Macdonald Roa Walthamstow, E.17. "Aneroid, Phone London." Walthamstow 18

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Buyers' Guide.



gnetos—

he M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-1009.

he British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicksmag, Phone, London." Museum 430

he British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

:al Manufacturers—

ifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central 42-43.

:als in General—

Avenue 1432

thrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

itt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 005, 006, and 7006.

muel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

al Parts and Fittings—

cles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines)

roplane General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppishaut, Holborn, London." Holborn 4959.

craft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 "Upcast, Rand, London." Gerrard 276 (2 lines)

ott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2297.

vliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.

ckburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

tish Metal (Kingston), Ltd., Kingston-on Thames.

thrie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

mbard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

nn, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.

ntford, Fredk., Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261

ertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3006.

ery, Owen, & Co., Darlaston South Staffs.

key, Joseph & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 61.

Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, 'Phone, London." Holborn 410.

Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Aircraft Construction Co., Harlev Works, Beckton Road, E.16. "Aercracons, Canning, London." East 1300

Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

mpson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

ler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

al Shearing Tools—

tgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

al Spinnings—

old & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

iel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

ric Bolts—

lmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.

ery Owen & Co., Darlaston, South Staffs.

ellaneous—

erson, D., & Son, Ltd. (Roofs), Belfast "Anderson, Belfast." Belfast 4033-4034-4035.

den Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

ish Metal (Kingston), Ltd., Kingston-on-Thames.

wn Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.

bert Wood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

Lennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.

The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7, and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 294, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 26.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport. "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3473.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

The Selsdon Aero & Engineering Co. Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Steel—

Allen, Edgar, & Co., Ltd., Imperial Steel Works, Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines)

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." Kings Norton 261-262

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Eatikosil, Vic, London." Victoria 5073, 4210.

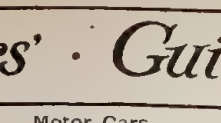
Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526

J. Owen & Sons, Ltd., 199a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The Aeroplane Buyers' Guide.



Acceptance and Experimental Flights -
The Prodger Isaac Aviation Co "Aeromnia, Piccy, London Gerrard 278 (2 lines)

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The 4a, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibric, Phone, London" Victoria 5340 Victoria 15 lines)

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London." Kingsbury 180
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol "Aviation, Bristol." Bristol 3906
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudron, Crickle, London." Hampstead 5551
Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4463 and 4464
Davison Aviation Co., Ltd., Hammersmith, W.6 Hammersmith 1092 (3 lines)
Dawson, John & Co., Ltd., Scotswood, Newcastle-on-Tyne "Dependable, Newcastle-on-Tyne" Central 2804 (2 lines)
Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne" Eastbourne 1176
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 180
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydrophil, Crickle, London." Hampstead 7420
Hooper & Co., Ltd., 54, St. James's St., Piccadilly, London, S.W. "Sportible, St. James, London" Regent 612
Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet "Martinsyde, Weybridge" Weybridge 349; Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston Museum 3373
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2 "Nieuport, Crickle, London" Willesden 2455
Norman Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 48
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6 "Carbodis, London" Putney 2242-2243
Roe, A. V., & Co., Ltd., Manchester, "Temple, Manchester" City 8530-8531, Manchester
Saunders, S. E., Ltd., Leg Cowes, I.O.W. "Consult, East Cowes" Cowes 193
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378
Sopwith Aviation Co., Ltd., Kingston on Thames "Sopwith, Kingston" Kingston 701
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.
Vickers, Ltd. Imperial Court, 81, St. Street, Knightsbridge, S.W.2 "Scherfer., Knights, London" Kensington 4800
Waring & Gillow, Ltd., Hammersmith "Warisen, Ox, London" Museum 5000
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 129
White, J. Samuel, & Co., Ltd., East Cowes "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond Surrey" Richmond 1805
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe." High Wycombe 84

Airships—
Airships, Ltd., High Street, Merton Wimbledon 1314
Short Bros., Rochester, Eastchurch, and White hall House, S.W. "Tested, Phone, London" Regent 378

Aluminium Castings (Sand & Die)
Coan R. W., 219, Goswell Road, London, E.C. "Krankases, Isling, London" City 8846

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds" Central 3927.

Blowpipes (Oxy-Acetylene)—
Acetylene Corporation of Great Britain, Ltd., The, 4a, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4830

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3 "Poetry, Fen, London" Avenue 9956, 6966, and 7000

Buildings—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4676

Casein—
Nirnuhol, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3 "Surneylon, Fen London" Avenue 34 and 35

Castings—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 13067

Clothing—
Burberrys, Ltd., Haymarket, S.W.1 Regent 2165
Dunhill, Ltd., Euston Road, N.W.1 "Dunhill, London" North 3405

Coloured Rags—
Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mexico Street, London" Hop 83 3601, 4272

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6 Hampstead 4728 "Aviduction, Phone, London"
P.D.V. Aircraft Co., Ltd., Frances Street, Richmond "Across, Richmond" Richmond 1681
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—
Mackenzie, J. & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London" Gerrard 2312
British Celluose Co., 8, Waterloo Place, S.W.1 "Celluose, London" Regent 3096
The British Emulsite Co., Ltd., 32, Regent Street, S.W.1. "Ridlespun, Piccy, London" Gerrard 280
Cellon, Ltd., Broad Street House, New Broad Street, E.C. "Cellon, London" London Wall 5359-3622
Clark, Robert Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Penguin, Westrand" Regent 3923

Engines and Parts—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford" Bedford No. 1
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-282
The Bentley Flying Ltd., The Brooklands Aerodrome, Cricklewood, N.W.2 Hampstead 4600
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 248
Dudbridge Iron Works, Ltd., Stroud, Glos. "Dudbridge, Stroud" Stroud 82
Wolseley Motors, London, S.W.1 "Aeroplight, Vic, London" Victoria 5040
Gordon Watney & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 350 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1263
Gwynne, J., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith, London" Hammersmith 1010
Napier & Son, D. Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Napier, London" Gerrard 8926.
Rotax (1915), Ltd., & Co., 1, Albert Embankment, London, S.E. Reliance 3000
Rolls Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolls, London" Gerrard 1034 5/6
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 685
The Gnôme & Le Rhône Engs., 47, Victoria Street, S.W., London "Wilamson, London"

Electrical Accessories—
Belling & Co., Derby Road Works, Upper Edmonton, N.18 Edmonton.
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London" General 2207, London
Mann, Egerton & Co., Ltd., Norwich Road, Lower Clarence Street, London, W.4 "Motors, London"
Premier Electric Heaters, Ltd., 360, Bolton Street, Birmingham "Premheat, Birmingham"
The Rotax Motor Accessories Co., Victoria Road, Willesden Junction, N.W.10 "Rotaxion, London" Phone, London
Wilkes, Ltd., Wolverhampton "Wilkes, Wolverhampton" Wolverhampton 1

Electric Cables—
E. Kalker & Co., Coventry "Kalker, Coventry"
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London" General 2207, London

Electric Lighting and Power—
E. Stanley Fordon, A.M.I.E.E., Street, Manchester
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London." General 2207, London

Electro Platers' and Polishers' Engineers—
W. Canning & Co., 133-137, Great Street, Birmingham "Mercury, Birmingham" Birmingham 3622 Central

Enamel
Silico Enamel Co., New Cross, London

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibric, Phone, London" Victoria 5340

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch"

Flying Schools—
Bournemouth Aviation Co., Ltd., Throop, Bournemouth "Riches, Westbourne"
Cambridge School of Flying and Aeroplane, 308, St. Andrew's St., Cambridge, Cambridge "Cambridge"
P.D.V. Aircraft Co., Ltd., Frances Street, Richmond "Across, Richmond" Richmond 1681

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury House, London, E.C. London Wall 573

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich

Gauges—
J. A. Prestwich & Co., Northcote Works, Tottenham, N.15

Gears—
Moss Gear Co., Ltd., Hope Street, Birmingham "Mosgear, Birmingham"

Glue—
Improved Liquid Glues Co., Ltd., 6, Cole Street, E. (Croydon) "Wpp, London"
Morline Co., 8, Arthur Street, E.C.4 Oldwood Wm., & Sons, Ltd., 6, Mark

Goggles—
Triplex Safety Glass Co., Ltd., Street, Piccadilly, W. London

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., Southwark Street, London, S.E. "Tonton" Hop 32

Hollow Spars—
McGruer Henwood Hollow Spar Co., Mermaid Wharf, Penrith, Cumberland
Robert Young & Co., Crown Works, Thornaby-on-Tees, Yorks. London, N.1
Gordon Watney & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 350 (7 lines)

Instruments—
British Westinghouse Co., Ltd., W.C.

Instruments (Scientific, meters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge
Short & Mason, Ltd., Wood Green, London
Watson & Sons, Ltd., 313, High Holborn, London "Watsonian, London"

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch"

Magnetos—
The Ml Magneto Syndicate, Ltd., Victoria Works, Coventry "Corlton, Coventry" Coventry 1008 1009
The British Ignition & Ignition Co., Ltd., 32, Tottenham Court Road, W.1. "Vickis, London" Museum 4300
Stanley Thomson Houston Co., Ltd., Lower Ford Street, Coventry "Asteroid, Coventry" Coventry 2278.

Metal Manufacturers—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Brass Metal (Kingston), Ltd., Kingston-on-Thames
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223.
Hudson Aluminium Co., Ltd., Westwood Road, Aston, Birmingham "Hudson, Birmingham"
Robery Owen & Co., Darlaston, South Staffs

Metals in General—
Avenue 1432
Bolton & Paul, Ltd., Norwich "Aviation, Norwich" Norwich 851
Pritt & Co., 46, Fenchurch Street, London, E.C.3 "Poetry, Fen, London"
Samuel Mercer & Co., 108, Upper Thames Street, E.C.4 "Reconciled, Cannon, London" City 6342

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Aeroplane Metal Supplies, Ltd., Fulwood Works, Great Saughton, Edinburgh "Aeroplane, Edinburgh" Edinburgh 1
Aircraft Supply Co., Ltd., Argyll House, 246, Long Acre, W.C. "Upcast, Rand, London" Gerrard 276 (2 lines)
Armstrong, Whitworth & Co., Ltd., Scotswood, Newcastle-on-Tyne "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500
Arrol & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2207
Bayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts) "Bayliss, Wolverhampton" Wolverhampton 1041
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
British Metal Kingston), Ltd., Kingston-on-Thames
Gabriel, J. B. & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Leonard Rose and Tube Co., Lombard Street, Birmingham "Leonards, Birmingham" Midland 241 (2 lines)
Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston, London" Museum 70
Mountford, Ltd., 111, Fremo Works, Ltd., Ford, Fremont "Fremo, Bromwich"
Robertson, J. G. & Co., 1, Albemarle Street, London, W. Regent 3967
Robery, Owen & Co., Darlaston, South Staffs
Shorter, Ltd., 8, Soho Hill, Wednesbury "Shorter, Wednesbury"
The Sopwith Aviation Co., Ltd., Kingston on Thames "Sopwith, Kingston" Kingston 701
The Steel Co. of Wales, Ltd., Port Talbot, Glamorgan "Steelwales, Port Talbot"
Stone, J. & Co., Deptford, London, S.E. "Stonefort, London"
Tube Investments, Ltd., Holford, Birmingham "Tubulous, Birmingham" Midland 2401
Vickers, Ltd., Imperial Court, 81, Knightsbridge, S.W.2 "Scherfer, Knights, London" Kensington 4800
Waring & Gillow, Ltd., Hammersmith "Warisen, Ox, London" Museum 5000
Wolseley Motors, London, S.W.1 "Aeroplight, Vic, London" Victoria 5040
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe." High Wycombe 84

Metal Spinnings—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford" Bedford No. 1
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-282
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 248
Dudbridge Iron Works, Ltd., Stroud, Glos. "Dudbridge, Stroud" Stroud 82
Wolseley Motors, London, S.W.1 "Aeroplight, Vic, London" Victoria 5040
Gordon Watney & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 350 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1263
Gwynne, J., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith, London" Hammersmith 1010
Napier & Son, D. Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Napier, London" Gerrard 8926.
Rotax (1915), Ltd., & Co., 1, Albert Embankment, London, S.E. Reliance 3000
Rolls Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolls, London" Gerrard 1034 5/6
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 685

Metal Shearing Tools—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Bristol Tool Works, Ltd., Bristol "Instruments, Bristol" Bristol 21

Metal Spinnings—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford" Bedford No. 1
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-282
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 248
Dudbridge Iron Works, Ltd., Stroud, Glos. "Dudbridge, Stroud" Stroud 82
Wolseley Motors, London, S.W.1 "Aeroplight, Vic, London" Victoria 5040
Gordon Watney & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 350 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1263
Gwynne, J., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith, London" Hammersmith 1010
Napier & Son, D. Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Napier, London" Gerrard 8926.
Rotax (1915), Ltd., & Co., 1, Albert Embankment, London, S.E. Reliance 3000
Rolls Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolls, London" Gerrard 1034 5/6
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 685

Metallic Bolts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Bristol Tool Works, Ltd., Bristol "Instruments, Bristol" Bristol 21
Gabriel, J. B. & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Gordon Watney & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 350 (7 lines)
Hudson Aluminium Co., Ltd., Westwood Road, Aston, Birmingham "Hudson, Birmingham"
Robery Owen & Co., Darlaston, South Staffs

Miscellaneous—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Aeroplane Metal Supplies, Ltd., Fulwood Works, Great Saughton, Edinburgh "Aeroplane, Edinburgh" Edinburgh 1
Bolton & Paul, Ltd., Norwich "Aviation, Norwich" Norwich 851
Bristol Tool Works, Ltd., Bristol "Instruments, Bristol" Bristol 21
Brooks, Ltd., Belfast "Brooks, Belfast" Belfast 33 3034-3035
Gordon Watney & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 350 (7 lines)
Hudson Aluminium Co., Ltd., Westwood Road, Aston, Birmingham "Hudson, Birmingham"
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London" General 2207, London
Robery, Owen & Co., Darlaston, South Staffs
Short & Mason, Ltd., Wood Green, London
Watson & Sons, Ltd., 313, High Holborn, London "Watsonian, London"

Motor Cars—
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries"
Mann, Egerton & Co., Ltd., 360, 361, Lower Road, London N.W.10 "Manegerton, London"
Standard Motor Car Co., Coventry "Hyshed, Coventry" Coventry 530 (4 lines)

Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston-on-Thames
The Coventry Metal Engraving Co., Chilsworth Works, Worthing "Clegg, Worthing"

Observation Panels—
Hopkinson's Glass Co., Ltd., 1, Newcastle Street, Piccadilly, W. "Smallglass, Piccy, London" Regent 1340.
L. R. Concessions Verre Patents, Ltd., Lilton Street House, Lilton Street, Longacre, W.C. "Sweetamvo, Vee, London" London Wall 3266 3267

Pattern Making—
Frelk Ward, 6, 7, and 8, Allsop Street, Upper Baker Street, W. Padd 4743

Piston Rings—
British Piston & Piston Ring Co., Coventry Rings, Coventry Coventry 723

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London." Tottenham 2370-1

Power-Presses and Dies—
Bliss, E. W., & Co., 24, Pocock Street, Blackfriars Road, London, S.E.1 "Blissdon, London" Hop 4330

Presswork—
Robery Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch" Redditch 61

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Eberle Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Eberle, Kingston" Kingston 672
Integral Propeller Co., Ltd. "Avipro, Hyde, London" Hendon 4, Kingsbury 180
Lang Propeller, Ltd., Weybridge "Aerostyle, Weybridge" Weybridge 520 521.
Mann, Egerton & Co., Ltd. Norwich Works, Norwich "Motors, Norwich" Norwich 482 (4 lines)
Oddy, W. D., & Co., Leeds "Airscrews, Leeds" Central 2040, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2 City 3417
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 129

Pyrometers—
Yeovil "Yeovil 129
The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 26

Rigging for Aircraft—
Cordage & Co. & Co., Ltd., Wakefield, England "Cordage, Wakefield" Wakefield 460

Rubber Tubing & Accessories—
Hancock, James Lane, Ltd., 260, Goswell Road, London, E.C.1 "Manufactor, Isling, London" City 3812 and 3812

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester "Seatbelt, Manchester" City 4432

Screw-driving Machines—
Russell Bros., Redditch, Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 217
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (4 lines)
The Norman Thomson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 48
Short Bros., Rochester "Seaplanes, Rochester" Chatham 627
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 1337

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibric, Phone, London" Victoria 5340 (3 lines)
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rotaxion, London" Willesden 2480

Seats for Aeroplanes—
Bowes, E., Art Cane Works, 50, Park Lane, Leeds Central 3423

Shackles—
British Gold Shell Ring Co., Ltd., Hounslow, Middlesex "Goldshel, Hounslow" Hounslow 254
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rodsyndate, Phone, London" Willesden 2480

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Brass Metal (Kingston), Ltd., Kingston-on-Thames
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223.
Hudson Aluminium Co., Ltd., Westwood Road, Aston, Birmingham "Hudson, Birmingham"
Robery Owen & Co., Darlaston, South Staffs

Sheet Metal Work—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London." Tottenham 2370-1
Brass Metal (Kingston), Ltd., Kingston-on-Thames
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223.
Robery Owen & Co., Darlaston, South Staffs
The Acetylene Corporation of Great Britain, Ltd., 4a, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4830
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Selsdro, Phone, London" Regent 1181
Arthur Hill & Co., Silchester Road, North Kensington, W. Park 3443

Shock Absorbers (Elastic Cord)—
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223

Small Tools—
The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosody, Westcent, London" Museum 2055

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 255
Rapkin, Leo & Co., Ltd. (Oleo Plugs), 64, Portland Street, W.1 "Rapkin, Rath, London" Regent 7755

Springs—
Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 322.
Gabriel & Co., 4 and 5, A B Row, Birmingham "Gabriel, Birmingham" Central 1223
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines)

Stampings—
Avenue 1432
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London." Tottenham 2370-1

Steel—
Allen, Edgar, & Co., Ltd., Imperial Steel Works, Sheffield "Allen, Sheffield" Sheffield 4907
Firth, Thos. & Sons, Sheffield "Firth, Sheffield" Sheffield 3230 & 3237
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Sickbin, Berendt & Co., Birmingham "Berendt, Birmingham" Smethwick 224

Steel Stamps and Markings—
John Meerbo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1 "Dashar, Phone, London" East 3338 (2 lines)

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lilford, Birmingham "Fremo, Birmingham" Kings Norton 261 262

Tapes and Smallwares—
Marlemann, John & Co., 30, Newgate Street, E.C. And at Glasgow City 3115

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Timbood, Vic, London" Victoria 5375, 4210
Brown, R. F. & F. W., Willesden Saw Mills, Neasden Lane, N.W. "Brown, Willesden" Willesden 1200
J. Owen & Sons, Ltd., Bonnet, High Street, S.E. "Buchanan, London" Hop 3511 2 lines)

BUYERS' GUIDE cont. on next page

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark, R. Ingham & Co., Walter House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3023.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1305.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C., and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

By Royal Warrant of Appointment.

ESTABLISHED 1819.

ARNOLD & SONS,

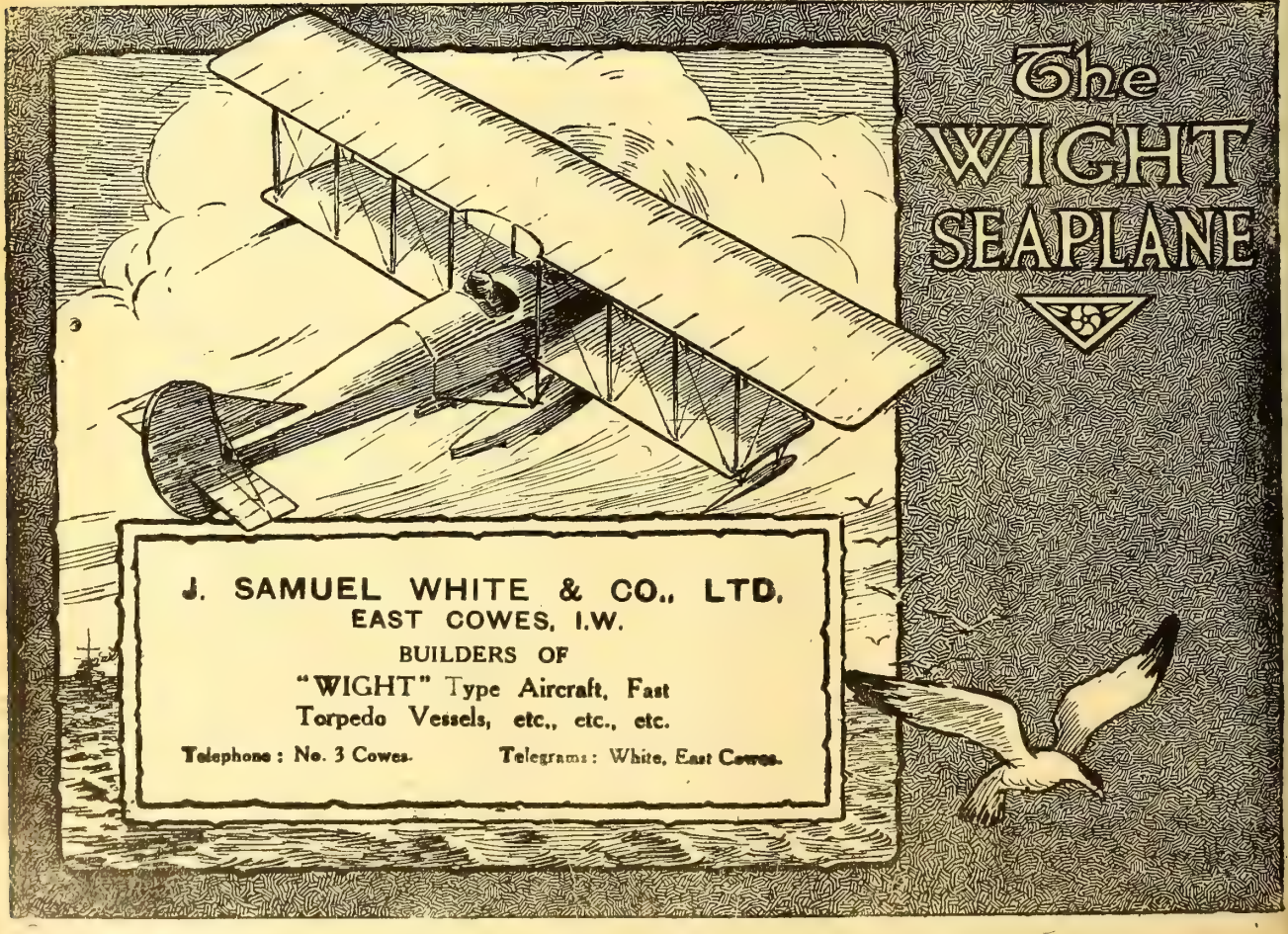
Engineers and Instrument Manufacturers,

Sheet Metal Work, Sheet Metal Pressing, Stamping, Spinning, Acetylene Welding, Nickel Plating, Silver Plating, Electro Tinning, etc., etc.

STANDARD WORKS, LAWRENCE ROAD, TOTTENHAM, N.15

Head Office: GILTSPUR STREET, E.C.1.

Telegraphic Address:—"INSTRUMENTS," LONDON. Telephone Nos.:—City Office: 5240, 5241, 5242 City. Factory: 2370 & 2371 Tottenham.



CONTRACTORS TO THE AIR COUNCIL.

ESTABLISHED 1912

The SUPERMARINE Aviation Works, Ltd.

DESIGNERS & CONSTRUCTORS OF FLYING BOATS.

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. SCOTT-PAINE, Director & Gen. Manager.

S.B.A.C. The Society of British Aircraft Constructors

Offices, Works, & Flying Waters—
SOUTHAMPTON, Eng.

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

TWO COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

Addresses of our fine Saw Mills, Works, etc.,
— have been camouflaged by the Censor. —

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams
JONAS,
SHEFFIELD.

REGISTERED
I C NOVO
TRADE MARKS.

Telephone
No. 4660.
Private Branch
Exchange.

SIR JOSEPH JONAS, COLVER & Co., Ltd.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

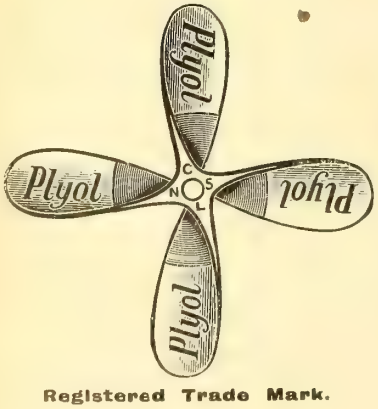
S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

"PLYOL"

THE BEST CEMENT FOR THREE-PLY, Veneering, etc.



Registered Trade Mark.

ALDGATE CASEIN WORKS.

NIEUWHOF, SURIE & Co., Ltd.

HEAD OFFICE

5, Lloyds Avenue, London, E.C. 3.

Works:
ALDGATE AVENUE, ALDGATE, E.C.

Also Casein especially adapted for Waterproof Paints, Varnish, etc.

Telephones
AVENUE 34, 35.

Telegrams:
"SURICODON, FEN LONDON."

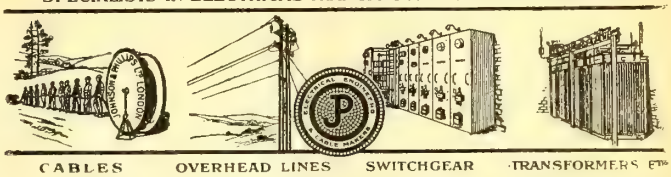


Electric Power Line.—Junction between Overhead and Underground Sections.



Switchgear and Transformers in Works Sub-Statio

SPECIALISTS IN ELECTRICAL TRANSMISSION AND DISTRIBUTION



CABLES OVERHEAD LINES SWITCHGEAR TRANSFORMERS Etc

ELECTRIC POWER

Please send us your enquiries for any Cabling or Overhead Line Work, Switchgear, Transformers, Motors, Lamps or Wiring Accessories.

We are large Manufacturers of all such Plant and Material.

Complete Installations contracted for.

12, UNION COURT, OLD BROAD ST., LONDON, E.C. 2

Telegrams "JUNO" LONDON

JOHNSON AND PHILLIPS LTD
ELECTRICAL ENGINEERS & CABLE MAKERS
CHARLTON, LONDON, S.E. 7.

Telephone 401 Greenwich

BIRMINGHAM 206, Corporation St. | CARDIFF 9, Park Place. | GLASGOW 159, W. George St. | MANCHESTER 251, Deansgate | NEWCASTLE-ON-TYNE 44b, Blackett St. | PORTSMOUTH Cleveland Rd. Guspet

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

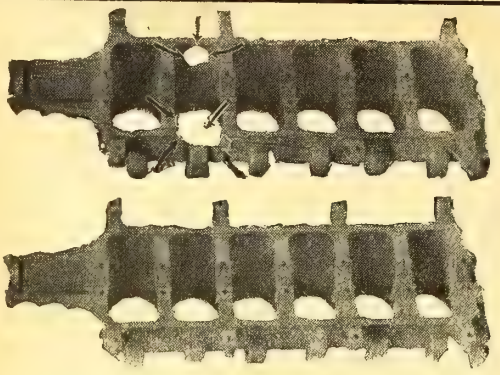
CONTRACTORS TO H.M. GOVERNMENT.

OFFICE AND WORKS—

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON



The top photo shows a nasty accident to an Aluminium Crank Case of a 160-h.p. Beardmore Aero-Engine.—"Air."

The bottom photo shows how the fractures were repaired and made good by Barimar, the Sir Frederick Treves of the Welding World.—"Air."

AIR, AIR!

Mr. Blin Desbleds, the Editor of "Air," refers in the March issue to Barimar as "the Sir Frederick Treves of the Welding World."

"Air" is the official organ of the Aeronautical Institute of Great Britain, and is at present conducting a vigorous campaign with the object of bringing into use for National Aircraft Construction tens of thousands of partially employed engineers and allied trade workers.

Barimar's object is somewhat similar. Barimar wants to rout out the idle apparatus and machinery that are put away useless until "after the war." Barimar wants to have a shot at welding broken parts that cannot be replaced until "after the war." Barimar wants to help you to run idle machinery to hasten the end of the war.

Barimar has made 25,000 effective repairs during the war period alone, and is willing to do as many more. Nearly all Government Departments patronise Barimar. Barimar is the surgeon for broken metal parts. Anything in the machinery line that is "stalled" through the breakage of a part that cannot be replaced is a good and fit object for Barimar's welding skill.

Barimar gives a guarantee of "money back" if repaired part fails to stand up to working test or strain.

You, reader of this advertisement, need a copy of "The Welding Test." It will show you, in a few seconds, just what can be done by Scientific Welding. If you have some broken parts lying in your dug-out and want them repaired, a copy of "The Welding Test" is yours free by post. If you merely want to see the book, please send 3 penny stamps to pay postage. In either case, be sure you ask for Manual "BC," and that you mention "Aeroplane."

There is an old, overworked motto that applies here—*Do it now.*

A note to the man of action who wants his job done without delay.

Remove all fittings from the broken part, see that a label bearing your name and address is attached, take the job to the passenger station. Always pay the carriage. Write us, giving name of railway, date of dispatch, and your instructions about repair. Simple—but effective.

Address your Repairs to Dept. "B.C."—

BARIMAR

LIMITED,

Scientific Welders of unlimited resource,

10, Poland Street, London, W.1.

Telegrams: Bariquamar, Reg. London. Telephone: Gerrard 8173

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY: 2 pints of glue.
LOADING: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

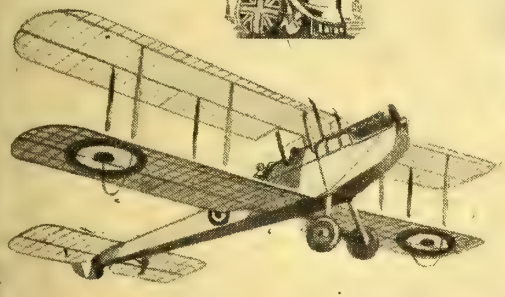
All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.

Britannia Dope

TRADE MARK



Britannia Dopes
(NON-POISONOUS)
and Varnishes

FOR AEROPLANES AND SEAPLANES

FOR FULL PARTICULARS APPLY TO THE APPROVED MAKERS—

ROBT. INGHAM CLARK & CO. LTD.

WALTER HOUSE,
BEDFORD ST., STRAND, W.C.
Telegrams: "Pearline, Westrand.
Telephone: Regent 3923.

WORKS .. WEST HAM ABBEY, E.15
Telephone ... East 955 & 956

PULVO

It doesn't need a 100 h.p. Engine to drive a baby's pram.

That is a Glimpse from the Obvious.

Are other things equally obvious as quickly grasped?

For instance, that if we have enough work to do for the next three months that it must be three months before we can promise anything fresh without a dislocation of some other job?

It can therefore be regarded as another Glimpse from the Obvious that July's needs should be ordered *now*. We can promise deliveries for July, if ordered now, and,

WHAT PULVO PROMISES
PULVO PERFORMS.

The PULVO ENGINEERING Co. Ltd.

10, 12, 14 and 16, DANE STREET, and 95 and 96, HIGH HOLBORN, LONDON, W.C. 1.

Telephone: Holborn 410. Telegrams: Pulvipult, West-Cent.

Contractors to the Admiralty and Air Board.

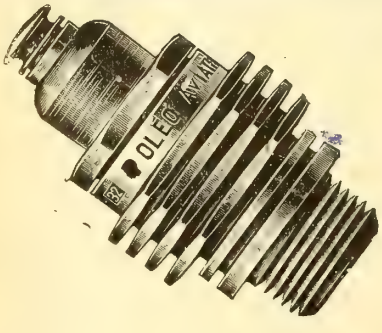
THE

CENTRAL AIRCRAFT COMPANY

DESIGNERS AND CONSTRUCTORS
OF AIRCRAFT.

Office and Works:
KILBURN, N.W.6.

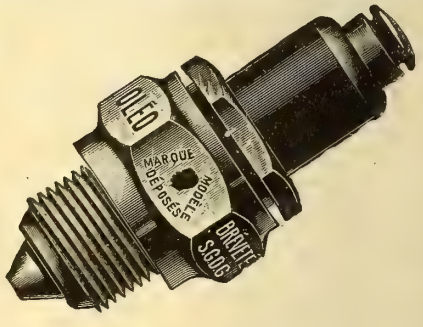
Telegrams: Aviduction, Phone, London.
Telephone: Hampstead 4403, 4404.



TYPE No. 32.



"The Smile of Success."



TYPE No. 27G.

OLEO were the first Aero Plugs ever made.
OLEO won the Aero Grand Prix SIX TIMES in succession.
OLEO Plugs have been supplied to the Government since 1913.
OLEO Aero Plugs have the "Largest Sale in the World."
OLEO Plugs have won over £30,000 in prizes.
OLEO Plugs were the first to Loop the Loop.
OLEO Plugs were the first to Cross the Alps.
OLEO Plugs are supplied to NINE Governments.

OLEO PLUGS
LEO RIPAULT & Co.
64a POLAND ST. LONDON, W.
TELEGRAMS RIPAULT REG. LONDON. TELEPHONE GERRARD 7758.

Honours and Industry.

A GREAT CHANCE OF IMPROVING A BAD RECORD.

We English have three super-jokes which stand out above all others by reason of their evident excellence—they are, in reverse order of merit, mothers-in-law, triplets, and the honours list. And the funniest thing about all three is that the man most deeply concerned, the recipient, as the case may be, of the honour, the litter, or the conjugal relative, almost invariably fails to see the real humour of the situation.

It is certainly a pity that the title or order, which should be a symbol of "something accomplished, something done" to the good of the British Empire, should lend itself to such ribaldry. But so it is. "The old order changeth, yielding place to new," and each new order seems to give a new opportunity to those set in authority over us to make fools of themselves in new ways.

Only a few years ago, as it seems, the Victorian Order was invented. Because it was new, it seemed scarcely worth having. Now, it has acquired an odour of sanctity, or of comparative antiquity, because of the invention of other orders still newer, and—euphemistically speaking—less expensive. I trust that none of my readers will, by reason of this expression, imagine for a moment that I think honours can be bought. I do not THINK anything of the kind. I know—what I know.

Let us, however, get down to the bone, where the meat is sweetest. What about this new order of the British Empire? A great card if it could have been played decently and in order. As things are, it has been used as a sop and as an ink-eraser to reduce to nothingness such blots as still remained obvious after the most copious whitewashing.

It has been showered upon parasites, it has rained upon nonentities, and it has positively descended in torrents upon the devoted (or otherwise) heads of Civil Servants. Now in what way does the Civil Servant who has done his duty during the war differ from the civilian who has done the same?

Mayhap in the degree of his civility, but if also in the degree of his positive utility, I should have no hesitation in saying upon which side the advantage lies.

If the Secretary of the Assistant Secretary of the Deputy Assistant Director of the Corkscrew Department of the Ministry of Temperance is worthy to become an M.B.E., while the Assistant Secretary achieves the distinction of an O.B.E., and the Deputy Assistant Director himself aspires to a C.B.E. or even a K.B.E., what about the man who makes the corkscrew which provides all these people with their jobs?

Is it expected that, being a manufacturer, he is necessarily coining money fast, and will, in his own good time, purchase a title of pre-war model, to the great benefit of the funds of some political party?

Is it presumed that, because he is a maker and not a mere distributor, he is actuated by no patriotic motives, and is therefore unworthy of recognition?

There may be cases to which each of these suppositions applies, but it is not fair to generalise upon the strength of them.

It is also a mistake to imagine that all the work of real national importance is done in Government offices.

I quite realise that I may be accused of beating the air, and told that many honours of B.E. type have gone to the head-lights, side-lights, and even the tail-lights of industry.

There are a certain number of people connected with the Aircraft Industry who have been treated as almost, if not quite, the equals in sterling merit of the Controller of Bootlaces and Waistcoat Buttons.

Agreed; but the thing has been done in a slip-shod sort of way. If we wanted to form a Committee of Aircraft Manufacturers, how ought it to be done? I don't say "How is it done," but "how ought it to be."

The only right and proper way would be to call the Industry together, explain what the proposed committee is for, and then leave the people who know to elect the best men for the job.

Now what is the matter with the same process as applied to honours? At present the Government rations them according to its lights, and possibly without complete disregard for its pocket.

But this same Government tells us that it hates rationing, that it is a thankless and unpleasant job, and that it will leave the industries to do their own rationing at the earliest possible moment. Here is our precedent: why not apply it?

Let the Government do what rationing it must. Let it say, "We cannot create more than 200 knights of the British Empire in one day. We will give the C.B.E. to 500, the O.B.E. to 1,000, and the M.B.E. to another 1,000. Half of all these people shall be chosen from Government Services; the other half from among civilians who have done good Imperial work from among those who have led and fought in the war of material. Now what are the industries to which the Empire is chiefly indebted? They are this, that, and the other. To this—perchance the Aircraft Industry—we will give three K.B.Es, six C.B.Es, and a dozen each of O.B.Es. and M.B.Es."

Now this is the point at which the Government should cease to interfere, merely communicating its decision to the Industry and awaiting results.

The Industry—in our case the Society of British Aircraft Constructors, as the representative body—would call a general meeting.

A satisfactory method of election would be devised, voting papers would be posted or passed round, and the men selected would be the real leaders and lights of the industry, those recognised and respected by the men who know most about their standing, their methods, and their real utility.

To these the honours would be offered, and I think that a refusal would be very rare.

At the present moment there are plenty of plain misters who could have been possessed of handles had they so desired.

Some have refused because of the humiliating conditions attached to the offer; others because they have felt themselves unworthy; others again for other causes. But a man could hardly refuse to accept the verdict of his own co-workers, or the honour which he would hold, so to speak, in trust for his industry.

However great his own modesty or his dislike for personal publicity, he would hardly fail to appreciate an honour coming to him in this way—one with regard to which no one could conceivably hint at bribes or purchase, or hidden influence.

What a chance, too, for the Government to prove, beyond possibility of dispute, that some at least of these honours—which ought to be highly prized as indicating exceptional service during the greatest war of history—are totally disconnected from political consideration, and the jugglery upon which the Party System is still dependent for the maintenance of its precarious balance.

MEDWAY.

EQUILIBRIUM INDICATORS.

From time to time reference has been made in The Aeroplane for the need of an instrument which will indicate to the pilot of an aeroplane when in the dark, or in the middle of a cloud, the true horizon and the relative position of his machine thereto. It is well known that even very experienced pilots are often unable to determine whether their aeroplanes are diving vertically, or spinning round on quaint curves, unless it is possible to see the ground.

The result of the remarks to this effect has been to cause various people with latent talent for invention seriously to set to work to find a solution to the problem. Aircraft engineers, knowing the difficulties, have practically shelved investigation in favour of more hopeful researches, but other people who are ignorant of the mechanical forces which operate in and around the flight of an aeroplane have solved the difficulty—to their own satisfaction—in about five minutes.

In almost every case a little gadget has been produced which depends upon the force of gravity to cause it to function, and usually a pendulum or a spirit level figures in the mechanism.

It should be pointed out, once and for all, that any indicating device which relies for its operation upon gravity is quite useless, because almost every deviation which an aeroplane can make from a straight line is accomplished by a movement through a curved path, with a consequent manifestation of centrifugal force, which operates on the spirit level or the pendulum just as it does on the aeroplane.

That is to say, if an aeroplane does a correctly banked turn the plumb-bob remains central, but if it chooses to perform a spin the machine takes up a bank inappropriate to the curve through which it is travelling, and the pendulum or the plumb-bob swings out to a position which tells one nothing.

If the machine loops the loop correctly, the plumb-bob remains central, but if it performs a side-slip without turning, the plumb-bob swings aimlessly.

If, as usually happens, an aeroplane starts flying on its own account, owing to the pilot having lost his orientation, the antics which it performs combine looping the loop, spinning, side-slipping and wobbling generally, so that the pendulum or the spirit level will wobble about just wherever they please and thereby indicate nothing. As one pilot put it, the bubble in the spirit-level turns into soda-water.

The need for an instrument to indicate equilibrium still remains as great as ever, but its mode of operation must be such that neither gravity nor centrifugal force affect it in any way, and a new line of research is therefore essential.

The gyroscope is the obvious way out, but it is too heavy to pay for its carriage merely as an indicator. The simplest thing to do is to make a machine inherently stable, by pure aerodynamic design and then leave it alone.

PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane from the current Official Patents Records :—

Patent Applications.

Davies, A. H. Bombs and bomb-release mechanism for use in aircraft. No. 6106. April 10th.

Davies, R. L. Bomb-dropping sighting-apparatus for aircraft, adapted for automatically and synchronously training a gun on the object sighted. No. 6177. April 11th.

Davies, R. L. Clinometer for aircraft. No. 6176. April 11th.

Doran, W. T. St. Vincent. Clinometer for use on aircraft. No. 6234. April 12th.

Ferrier, A. Bombs for use on aircraft. No. 6096. April 10th.

Holden, H. Shaping-machines for aeroplane propeller blades. No. 5945. April 8th.

Mooney, D. J. Spars, etc., for aircraft. No. 6206. April 11th.

Munford, T. A. S. Sight for machine-guns, etc., for anti-aircraft work. No. 6314. April 13th.

Orling, A. Photo-electric aircraft revealer. No. 6255. April 12th.

Shakespeare, G. A. Fabrics for balloons, etc. No. 6047. April 9th.

Smith, R. A. Means for stabilising balloons when towed by vessels at sea. No. 6276. April 13th.

Sopwith Aviation Co. Clip, etc., for wires of aeroplanes, etc. No. 6308. April 13th.

Taylor, G. P. Propellers of flying-machines. No. 6081. April 10th.

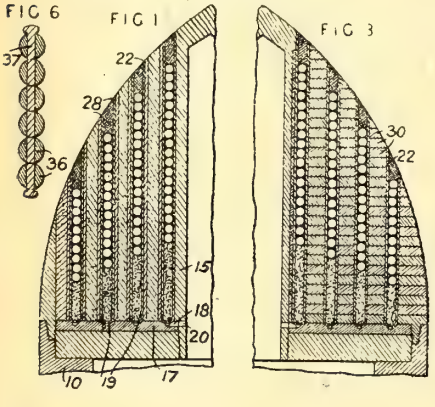
Complete Specifications Accepted, prints of which can be obtained on and after May 2nd, 1918.

114,498. April 19th, 1917. Bruce, R. A. Seat fittings for the cars of aircraft.

106,818. May 1st, 1916. Levy, L. G. Aeroplanes and hydro-aeroplanes.

Abridgments of recently published Specifications.

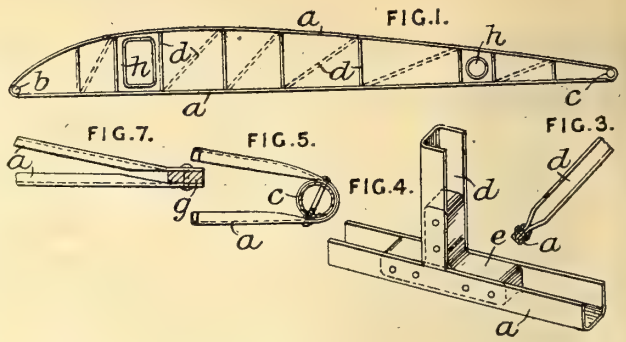
113,226. Ammunition. Graham, A. W., 184, Northland Avenue, Buffalo, New York, U.S.A.



Projectiles.—Relates to projectiles of the kind in which the nose is provided with concentric rows of barrels 28, Fig. 1, containing bullets adapted to be discharged forwards in succession during flight. According to the invention, these rows of barrels are connected by fuse channels, which ignite the propellant charges in the barrels in regular sequence. These channels are arranged radically and circularly at 18 and 19 respectively in a disc 17, and ignition is communicated thereto by a time fuse through powder in a port 20 and a central tube 15. The barrels may be formed by drilling through a solid nose, or may be constituted by tubes embedded in cementing material between concentric cylinders 22, or in holes in a series of discs 30, Fig 3. For use against wires and aircraft, the bullets may be made of several balls 36, Fig. 6, strung on a headed wire or pin 37. The body 10 of the projectile contains an ordinary bursting charge.

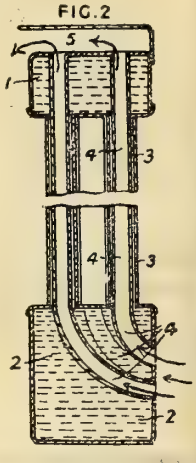
113,295. Aeronautics. Saunders, Ltd., S. E. and Thomas, H. H., Columbine Works, Medina Road, East Cowes, Isle of Wight.

Framework; Planes, Construction of.—The fuselages, plane ribs, and other parts of aircraft are constructed of metal of U or channel section, bent to form an outer frame which is then braced by bars of similar section secured by riveting, soldering, welding, etc. Fig. 1 shows the rib of a plane formed of an outer channel *a* bent over front and rear bars *b*, *c* and fitted with channel braces *d* and with metal stampings *h* to receive the spars. Fig. 3 shows one method of jointing the braces *d* within the channel *a* by riveting, and Fig. 4 shows another method



employing a solid connector *e*. Fig. 5 shows the channel *a* flattened out for connection to a tubular end member *e*, and in Fig. 7 is shown a similar connection where the end member consists of a flat rod *g*.

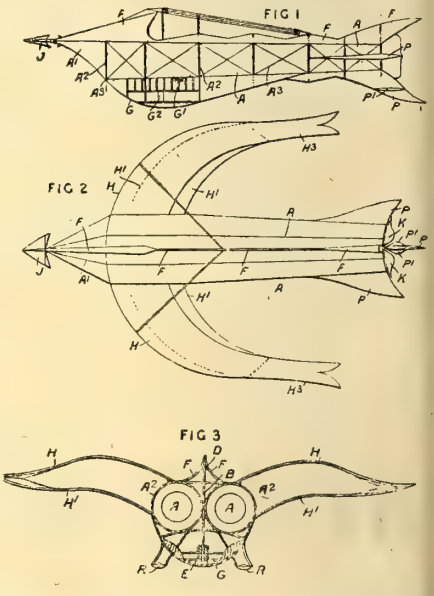
113,238. Radiators for Internal Combustion Engines. Bell, F. J. (trading as Bell Brothers), 136, Highgate Street, Birmingham.



A radiator for use in connection with internal-combustion engines of motor road vehicles, aircraft, etc., comprises upper and lower tanks 1, 2 connected by water-tubes 3 enclosing centrally arranged air-tubes 4, which pass right across the tanks 1, 2 and have their lower ends forwardly bent to facilitate the entry of air. A protecting shield 5 is arranged over the upper ends of the tubes 4. A fan, pump, etc., may be arranged to increase the flow of air through the radiator.

113,286. Aeronautics. Revenall, B. P., Ingham, Queensland, Australia.

Aerial Machines without Aerostats; Framework; Planes, Arrangement of.—An aeroplane or hydro-aeroplane comprises a fuselage consisting of one or two open-ended tubes. A fitted with upper and lower wings H, H^1, a car G, and fins F, P. The tubes may be made of thin steel or aluminium, or may comprise wooden or metal hoops A^2 connected by longitudinals and bracing A^3 and covered with aeroplane fabric. The hoops are connected to vertical struts B which are secured to upper and lower longitudinals D, E.



Cars and Cabins; Aerial Warfare.—The car G is formed under the tubes A and is provided with windows or gun ports G^1 and doors G^2. The lower part or the whole may be armour-plated.

Planes, Construction of.—The upper parts of the tubes A are extended forwards to a point as shown at A^1. The wings H, H^1 are curved rearwardly in plan and formed with flexible forked extremities H^3. They are curved in section as shown in Fig. 3 and united at their extremities, and are made detachable. The longitudinal fin F comprises two concave portions extending up from the tubes A as shown in Fig. 3, and is undulated as shown in Fig. 2, the highest point being above the centre of gravity of the machine. The underneath fins P have lateral extensions P^1.

Propelling.—Propellers may be arranged at the front of the tubes A.

Steering.—The machine is fitted with front and rear elevators J, K, and the flexible forked extremities H^3 of the wings may be adjustable.

Floats, Arrangement of.—In the case of hydro-aeroplanes, floats R are provided at the forward part, and another float may be located at the rear.

"TRIPLEX" GIVES PERFECT VISION AND ABSOLUTE SAFETY.

IT CANNOT BE SPLINTERED.



"TRIPLEX" IS THE ONLY SAFETY GLASS FOR WINDSCREENS, OBSERVATION PANELS, GOGGLES, etc.

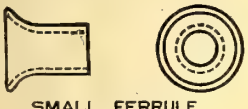
GOGGLES FROM 7/6 PER PAIR.

'TRIPLEX' SAFETY GLASS

MANUFACTURED SOLELY BY
THE "TRIPLEX" SAFETY GLASS CO., Ltd. (REGINALD DELPECH, Managing Director.)
1, ALBEMARLE STREET, PICCADILLY, LONDON, W.1.

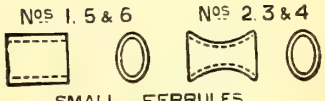
Tel.—Regent 1340.

Telegrams—"Shatterlys, Piccy, London."



SMALL FERRULE. PATTERN "A."

WE CAN SUPPLY THESE AT ONCE



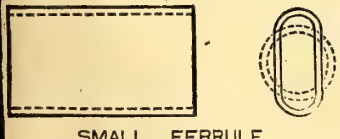
Nos 1, 5 & 6 Nos 2, 3 & 4

SMALL FERRULES PATTERN "C."

IN VARIOUS GAUGES AND LENGTHS
- SEND FOR FULL PARTICULARS -

FERRULES FOR AIRCRAFT WORK

THE AEROPLANE STEEL TUBE AND PRESSWORK ARTIFICERS

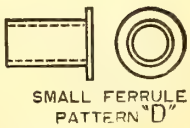


SMALL FERRULE. PATTERN "B."

ACCLES & POLLOCK LIMITED

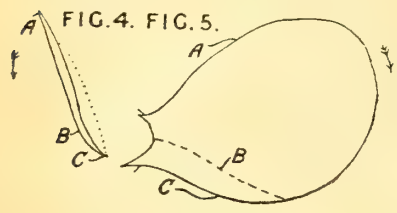
OLDBURY BIRMINGHAM

Telegrams: "ACCLES," OLDBURY Telephone: OLDBURY 111 (4 lines
A.B.C. CODE, 5th Ed.



SMALL FERRULE PATTERN "D"

113,359. Screw and like Propellers. Staunton, P. M., Aram Lodge, Castlerea, County Roscommon.



The forward surface or back of a blade is bent or curved back at its leading edge so as to develop more fully the formation of water cavities and thus increase the "negative pressure" on the blade. The driving surface A B C of a blade is plane from A to B and curved from B to C, the curved part extending from the boss outwards. Blades for aeroplane propellers are made relatively longer and narrower than the blades shown. Specifications 27662/08, 28995/09, and 27763/13 are referred to.

THE ITALIAN AIRCRAFT INDUSTRY.

Nearly a dozen new companies dealing with Aviation have been registered recently, many of which in the Southern Provinces.

The Società Marittima Italiana of Naples, which is an insurance firm going in for aero-transport risks policies, has become a "Società Anonima."

The firm of "Ing. Nicolà Romeo & Co.," of Milan, has raised its capital from 10 millions to 30 millions of lire, and has become the "Società Anonima Italiana" of that name.

Ing. O. Pomilio & Co. are transferring the official headquarters of the business to the capital.

Judging by the budding of business concerns this spring much fruit should be forthcoming by the summer.

Another of the numerous accessories now in use, and which these notes could not even in peace time adequately deal with, is the Gabbioneta four-bladed petrol pump fitted to the Caproni machines among others. The fitment has gained its place there, and so here, on its merits.

At a ceremony in memory of the heroic Capuan Captain Oreste Salamone at that place the High Commissary for Aviation said in his speech: "We must prefer the offensive to the defensive. Italy must be one big trench in the face of the enemy. We have to avenge Salamone and our other martyrs by silent work in preparing more arms, more aeroplanes, more men. . . . . Southern energy and brains must be made available."

By connecting up with a tube two rectangular receptacles set at right angles to each other, and partially filled with a suitable liquid, Engineer Corrado D'Ascanio has evolved a simple fool-proof lateral and longitudinal inclinometer. The receptacles are deep, long and narrow, of glass—triplex?—and lie the one transversely to the path of travel, the other parallel to it. Their sides are ruled to show deviation from the horizontal of the lateral or longitudinal axes of the machine.

The "Officine Ferroviarie Meridionali," a big company for railway material at Naples, has started an aviation department for building and repairing aeroplanes, and making spare parts for them either in wood or metal. The company's nominal capital is 4,000,000 lire.

Another new company of some special importance in view of the development of the South is the "Aeromarittima Italiana" of Naples. Its paid-up capital is 1,500,000 lire.

The Frèjus-Diatto motor firm at Turin has been taken over by the people who have so successfully launched the Pomilio concern of that city.

One notes the huge sum invested in the new War Loan by the "Savoia" firms and their hands. 1,200,000 lire is the great figure. A lot even in these days of excess profits.

Of the many U.S. fliers of whom one hears here nowadays, the Captain La Guardia, an American citizen of Italian origin, who is instructing near Rome, appears on account of his oratory in both tongues to be a golden find on the part of the "*Propaganda Fide*," as the church folk call the society which acts in this sense for the Holy Mother.

Major Ryan and Captain Frost are other names to bear in mind.

Is Gabriele D'Annunzio going to enthuse the Argentines too? Who forbids the Muse?—T. S. Harvey.

"THE JACKDAW."

Quite a number of reviews of works magazines have appeared from time to time in The Aeroplane, and while their arrival has been welcomed as an indication of enthusiasm of those concerned with their production, in many cases interest has been destroyed by the uniform nature of the lines on which they have been produced.

The latest arrival, "The Jackdaw," has much of the original to recommend it for attention. This is hardly surprising when one learns that the originator is Mr. G. Humphrey, the Managing Director of the John Dawson Co., Ltd., of Newcastle-on-Tyne, who ever since he became known to the aircraft world has been noted for his originality, particularly as concerned with advertisements.

The editorial on the subject of "Firsts" is an extremely clever conception, in which he points out how interesting the first of anything is, although on its arrival one seldom remembers that it is important merely as the promise of what is to come. Take the first aeroplane as a case in point.

A section entitled "The Labour Column" is published to provoke discussion among the readers of "The Jackdaw" and to stimulate ideas to form the subject-matter for dinner-hour debates, a distinctly useful innovation which should leave no excuse for the objectional hobby of grousing purely as a means of killing time.

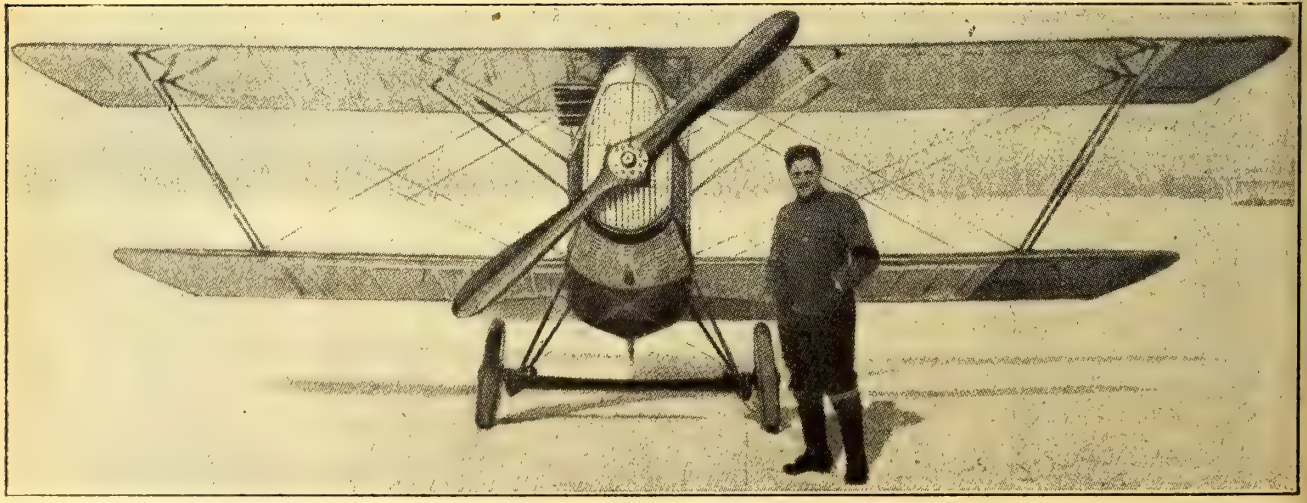
In the opinion of the editor of "The Jackdaw," employers and workers should join hands on the very sound basis that the highest possible wages in return for the greatest possible output is the way to industrial peace and national prosperity.

MAN-POWER AND THE WAR.

The following resolution has been passed by the Metal Merchants Section of the London Chamber of Commerce: "That this meeting approves the appointment of a Committee to confer with members of Parliament with a view to constantly raising questions of interest to the trades concerned in the House of Commons."

For months the Chamber has been pressing the Government as to the serious effect Government trading has on the nation and the effective conduct of the war, and the resolution is a result of that view.

A Watch Committee to investigate cases was elected, and Mr. P. C. Donald, 25, Upper Thames Street, E.C., is willing to receive information respecting (1) flagrant cases of unavoidable delay, (2) inefficient methods, (3) unnecessary red tape, (4) wasted man-power efforts in Government Departments, (5) departmental inexperience, and other abuses tending to delay the delivery of war material or seriously affecting after-war conditions. The purpose is to have them brought up in the House of Commons.



(Reproduced from "Aerial Age.")

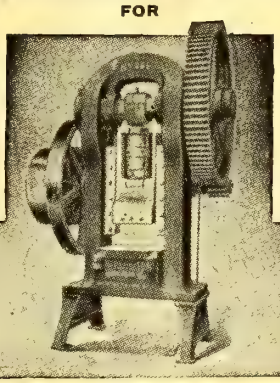
AN ITALIAN CHASER (Reproduced from "Aerial Age"): The Pomilio single-seater fighter.

BLISS

PRESSES & DIES FOR

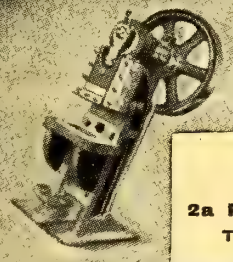
AEROPLANE

SEND YOUR STAMPING PROPOSITIONS TO US.



STAMPINGS

WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.





WRITE TO

E. W. BLISS CO.,

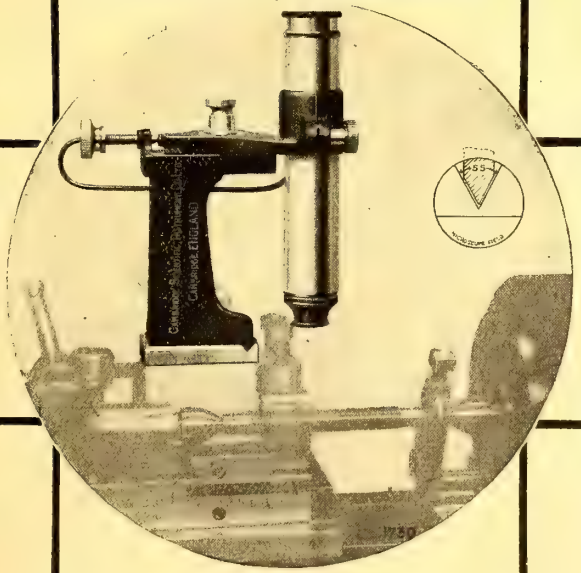
2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1

TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."

CAMBRIDGE MICROSCOPE LATHE ATTACHMENT

An easily applied aid to precision screw cutting, ensuring:—

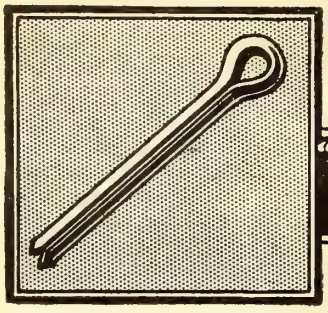
Accurate Tool Setting,
Close Watching of Work,
Easy Tool Replacement.



With this attachment the inaccuracy in Tool Setting should not exceed 0°.3'.

For further particulars see List No. 137M.

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO., Ltd.,
CAMBRIDGE :: :: ENGLAND.



"Everything from a split pin to a complete unit"



What d'ye lack?

WE bend the old-world call to modern needs: "What do you lack in aircraft parts?"

Visit our Showrooms at Ascol House, Long Acre, and there you will see displayed in orderly sequence all the requisite parts and equipment for Aircraft Construction, covering most items from a split pin to a complete unit.

We offer a complete and comprehensive service for Aircraft Manufacturers. Our aim is to give you all the help we can in the great national "speed up" of aircraft construction. Let us give you the benefit of our organisation and stocks.

THE
AIRCRAFT SUPPLIES
COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

Managing Director: G. H. MANSFIELD.

Telephone: Gerrard 276.

Telegrams: "Upcast, Rand," London.

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

April 18th, 1918.

COPPER.—There has been very little alteration in the general position of this market. The output of Copper is very satisfactory, and the total figures for 1918 are likely to show a considerable improvement on 1917.

The question of price is still influencing sellers in U.S.A. Although inquiries are being received for forward delivery, there does not appear to be much inclination to take orders, the general feeling being that the Government must sanction an advance in price.

Prices.

Standard Copper	£110 0 0
B.S. English	£123 to £119
Electrolytic	£125 to £121

TIN.—This market is in a very uncertain condition. Prices have recently advanced, due, apparently, to the prices in the East having been forced up, and although there are plenty of buyers waiting to place orders, sellers are very backward.

There is still a big difference between the London price and the price in the East. This probably accounts for the lack of offers, and is furthermore responsible for the general feeling that the tendency of the market is upward.

The position in U.S.A. is still very serious and buyers are keenly snapping up every pound of available Tin.

Comparative Prices.

To-day, 18th	£322 0 0
April, 12th	£322 0 0
April 6th	£316 0 0
Last month	£320 0 0
Highest price, 1917	£309 0 0

LEAD.—There appears to be ample supplies of Lead now available for war purposes, and the position generally has improved. Prices remain unchanged.

STEEL.—This market is in a very satisfactory condition. Ample supplies of steel are available. In fact, one occasionally hears of firms looking round for orders. The mills have certainly done remarkably well during the past 12 months.

Seeing that there is an indication that the output of certain steels is now greater than the demand, it is quite probable that the Ministry of Munitions will relax some of the export restrictions. As stated previously the stoppage of Russian orders has relieved the Tool Steel position.

Prices still continue unchanged.

TIMBER.—The shortage of Timber supplies, particularly Silver Spruce and suitable substitutes, is causing very grave anxiety amongst Aircraft constructors.

It is reported, on very reliable authority, that several firms engaged on aircraft work have practically no suitable timber in stock. One factory, at least, is unable to make headway owing to scarcity of timber. It is certainly time that the responsibility for this serious state of affairs was fixed and the culprit or culprits brought to "boot."

The present famine was foreseen months ago, and on many occasions this paper has uttered grave warnings.

Even as far back as June last attention was called to the prevailing shortage, and again in November the problem was dealt with.

It will do no harm to reiterate the probable causes for what was then a "Timber crisis." See issues December 5th and 12th, 1917.

The present crisis can only be attributed to one or more of the following causes :—

(1) Failure to grasp the future (now present) requirements of the Aircraft Industry.

(2) Failure to allow for unforeseen contingencies, i.e., submarines, strikes, rejects.

(3) Delay in authorising and securing more than ample supplies of Silver Spruce substitutes when the shortage was beginning to show itself.

(4) Failure in ensuring that the Silver Spruce was perfectly suitable for aircraft work before being shipped.

(5) Failure in providing shipping for merchants who could get the wood.

(6) Failure in giving permission for a substitute to be used on school machines.

(7) Failure in carrying out a drastic reformation of A.I.D. inspection of wood parts and units.

If the substitute timber which was imported by the Government had turned out satisfactory for general aeroplane work, i.e., struts, spars, longerons etc., etc., the present serious condition of affairs would have been averted and it would be interesting to have answers to the following questions :—

(1) Why did the Air Board put all its eggs in one basket and purchase one substitute only (rumour says several thousand standards) when there were other suitable woods available?

(2) Did it make quite sure that the parcels were suitable for aeroplane work before they were shipped?

(3) What will be done with this huge quantity if it fails to pass Specification VI.?

Prices remain unaltered.

FABRIC.—Supplies are fairly well maintained, and energetic measures are being made to avert a serious shortage during the next few months. It appears to be a "touch and go" state of affairs.

MICA.

The Minister of Munitions, in exercise of the powers conferred upon him by the Defence of the Realm Regulations and all other powers thereunto enabling him, hereby orders as follows :—

1. No person shall as from the date hereof until further notice purchase or take delivery of any Mica as hereinafter defined situated in the United Kingdom except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions, or sell or deliver any such Mica to any person other than the holder of such a licence and in accordance with the terms thereof.

2. No person shall as from the date hereof until further notice use any Mica for the purpose of any manufacture or work except under and in accordance with the terms of a licence issued under the authority of the Minister of Munitions.

3. All persons shall send to the Controller of Non-Ferrous Materials (MS/R), Ministry of Munitions, 8, Northumberland Avenue, W.C.2, such returns with regard to their stocks, purchases, sales and deliveries of Mica and any contracts or orders made or given to or by them requiring for their execution the use of Mica as shall from time to time be required by the said Controller of Non-Ferrous Materials.

4. All applications for licences under this Order shall be made to the said Controller of Non-Ferrous Materials and marked "Mica Licence."

5. For the purposes of this Order the expression "Mica" shall mean block Mica of the following quality and size grades :—

Clear and partly stained "Ruby" of "best" or "Government standard" quality, or suitable for use in the manufacture of magneto condenser plates, in size grades No. 3 to No. 6, inclusive, or their equivalent in rectangular or other trimming, and shall include Mica coming within the above definition when split from block of any quality.

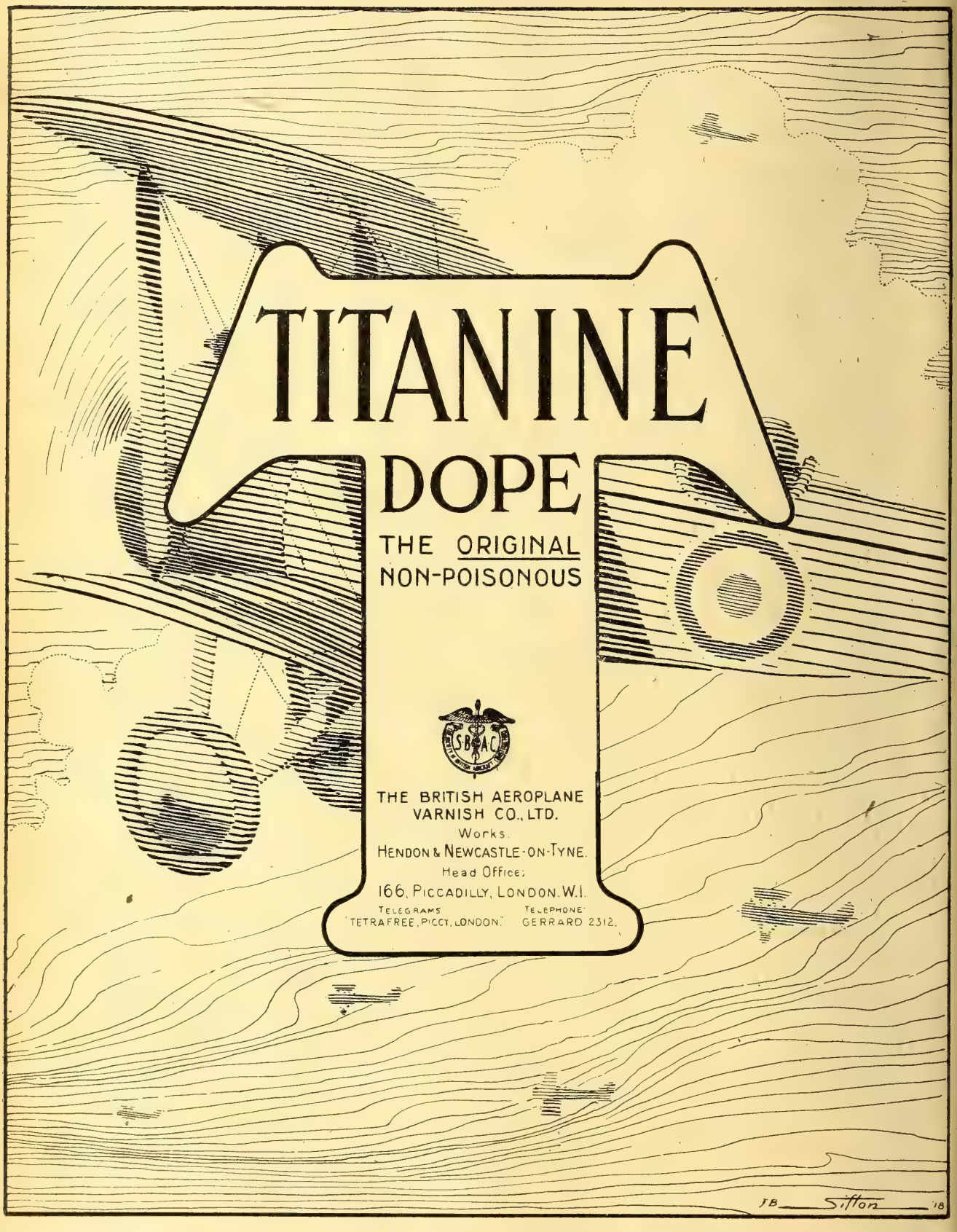
6. This Order may be cited as the Mica Control Order, 1918.

Note.—Any person acting in contravention of or failing to comply with the above Order or making a false return will be guilty of an offence under the Defence of the Realm Regulations, and be liable to penalties of fine and imprisonment.

FLAX AND HEMP.

The Flax Control Board announces that an Order has been made by the Army Council amending the Hemp (Restriction of Consumption) Order, 1918, by extending the restrictions imposed by that Order to hackled tow produced in the United Kingdom from hemp of the specified descriptions. A further Order provides that dealings in hackled tows produced from any flax or from hemp of the specified descriptions require the licence of the Scottish and Irish Sub-Committees of the Flax Control Board respectively.

Tow licences issued under the Order of March 21st, 1916, are withdrawn, and applications should be made, in the case of dealings in tow of these classes, to the Irish Sub-Committee, 31, Wellington Place, Belfast, or to the Scottish Sub-Committee, 10, Victoria Chambers, Dundee.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
Works.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON, W.1.
TELEGRAMS
"TETRAFREE, PICCY, LONDON."
TELEPHONE
GERRARD 2312.
JB Sifton '18

AIRCRAFT FINANCE

CURRENT TOPICS.

MUNITION CONTRACTS.

A point of more than general interest was voiced at the shareholders meeting of Mappin & Webb, Ltd., last week by the Chairman of the company in reference to the record sales of the past year. In the course of a lengthy speech, he said:—

"Very considerable munition contracts have been entered into during the year. You might expect to be told that these had materially helped our profits. As a matter of fact, they did not. We made little or no profit on this branch of our business. You have, however, the satisfaction of feeling that our company has helped in munitions, so much needed by your country."

Coming as this does concurrently with the disclosure of the Finance scandals connected with the accounts of the Ministry of Munitions and the Auditor-General's scathing comments, it prompts one to ask what is going to be done about it, when some firms can make no profit although money is being wasted elsewhere.

It cannot be assumed that although there is no word of dismissal of the responsible officials that the authorities view the facts with unconcern. Surely if ever there was a case in which names should be disclosed this is one. Otherwise every firm and company carrying out war contracts is under suspicion, and the matter is much too important to be shelved in this neglible manner.

BRENTFORD AIRCRAFT, LTD.

A prospectus marked "Private information for Directors and Members" is in course of being circulated with the obvious intention of securing capital from the public.

The company is of quite recent registration. The printed particulars refer to a "Private issue of 5,000 shares," and it is necessary to warn the promoters and directors that this method of procedure is in direct contravention (1) of the Companies Acts, and (2) of the Treasury Regulations both of which were framed to prevent just this very identical form of company promotion.

It is apparent from the printed particulars furnished that the company has nothing to sell, but the manner in which the printed information is set out might well lead an unsuspecting investor to imagine that the company own freehold property, whereas a careful perusal of the document shows that someone is to receive £400 for the benefit of the negotiations respecting the purchase of the property.

It is astonishing to find in the circumstances that the printed particulars bear the names of a worthy Lieut.-Col. (no doubt a better soldier than a company promoter) and the name of a firm of solicitors, but what is still more astounding is that the London County and Westminster Bank, Limited, should have permitted their bank to appear on the front page. It would not be a matter of much surprise to learn that they are not cognisant of the fact.—G. A.

COMPANIES ANNOUNCEMENTS.

NEW COMPANY REGISTERED

The file of the following new company is available for inspection at Somerset House.

Flightcraft, Ltd.—Private company. Registered April 3rd. Capital, £5,000 in £1 shares. Engineers, founders, smiths, machinists, manufacturers of and dealers in aeroplanes, airships and balloons, etc. Agreement with F. A. Coulson. The subscribers (each with one share) are:— F. A. Coulson, 199, Piccadilly, W.1, aeronautical engineer; J. A. Lockwood, 4, New River Crescent, Palmer's Green, N.13, company secretary. The first directors are:—F. A. Coulson, C. J. Axten, W. G. Fearn, and J. S. Lockwood. F. A. Coulson, C. J. Axten, and W. G. Fearn are permanent. Solicitors: Timbrell and Deighton, 90, Cannon Street, E.C.

DIVIDEND DECLARATIONS.

Vickers, Ltd.—The directors have decided to recommend a final dividend for the year 1917 of 1s. 6d. per share (free of income-tax at 5s. in the £) on the ordinary share capital of the company, making 2s. 6d. per share, or 12½ per cent., for the year, free of income-tax at 5s. in the £. The dividend will be payable on May 10th, 1918. The transfer books of the ordinary shares of the company will, in accordance with the company's articles of association, be closed from Monday, April 29th to May 10th, inclusive. The directors further state that they hope that the accounts for 1915 will soon be completed, but the completion of the accounts for 1916 and 1917 must still be delayed for a considerable time. An extraordinary meeting will be held after the general meeting on April 25th to alter the articles of association so as to give more powers to the directors. It is desired to acquire, establish, or carry on any business or industry, whether manufacturing or otherwise, which may be calculated to be profitable, and to form any company or companies for acquiring any property or rights which may seem directly or indirectly calculated to benefit the company.

MORTGAGES AND CHARGES.

Cowper-Coles Aircraft Co., Ltd.—Registered April 3rd, 1918. Debentures £10,000, secured by a general charge on the company's assets in favour of the London Provincial and South Western Bank, Ltd.

Handley Page Ltd.—Registered April 3rd, 1918. Debenture £100,000, secured by a general charge on the company's assets in favour of the London Provincial and South Western Bank, Ltd.

Norman Thompson Flight Co., Ltd.—Registered April 8th, 1918. Debenture £15,000, secured by a general charge on the company's assets.

ANSWERS TO CORRESPONDENTS.

"Air Raider."—The recent registration of the British Cellulose and Chemical Manufacturing (Patent Company), Ltd., with a capital of £3,500,000, has given rise to a mass of rather amusing guesswork with regard to its formation and composition. It is, of course, quite apparent from the composition of the Board that Vickers, the Nobel's Explosives Company, and certain important chemical concerns are interested in this important new company, but there is no foundation for the suggestion that it is the undertaking which will effect the proposed combination of the principal explosives companies. It is an entirely independent concern, though, of course, the explosive companies would naturally desire to be interested in undertakings which produce some of the materials they require for their business.

"Accounts."—Whilst without doubt there are many minor companies adopting the now fashionable camouflage of deferring the publication of accounts owing to outstanding questions connected with Excess Profits duties, etc., unquestionably there are cases where the accounts cannot be made up. Some important companies have supplied goods under contracts in which the price is not even definitely determined, consequently one must not regard every company coming under this category as open to suspicion. The method is, however, becoming too general to be healthy. G. A.

THE AEROPLANE BLUE BOOK.

This important work of reference is now on sale. It is rightly described as "A Directory of Aircraft Finance," containing as it does detailed particulars of all the important and many of lesser known companies manufacturing and connected with the Aircraft Industry.

It is published at the popular price of 1s. 6d. by The Aeroplane and General Publishing Co., Ltd., 2, Breams Buildings, Chancery Lane, and should be in the hands of every manufacturer, trader, official, and shareholder interested in the finances of the industry.

The information contained in the work comprises:—

The capital of each company, how divided, the amount subscribed, and the date of incorporation.

The names of directors, officials, and the registered address of the company.

Particulars of mortgages and charges.

Profits and dividends declared.

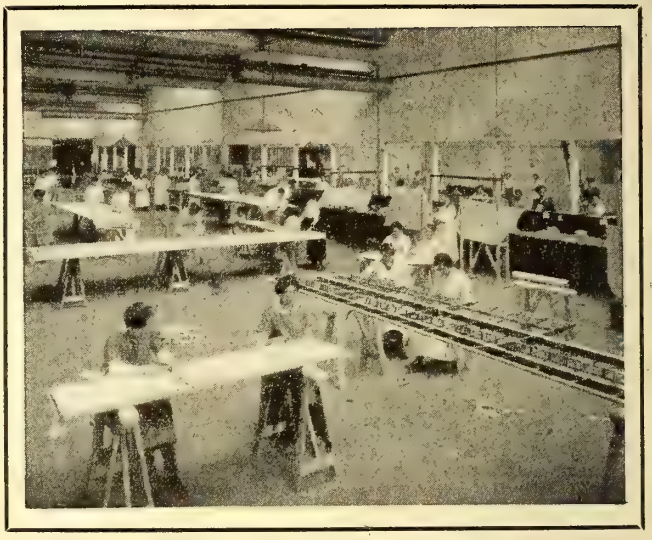
Date of making up annual accounts with extracts from last published balance sheet and directors' reports.

Every effort has been made to render the most complete information and the particulars wherever possible have been officially revised.

In consequence of the paper supply restrictions this issue has been necessarily limited. Immediate application for copies is therefore advised to avoid disappointment.

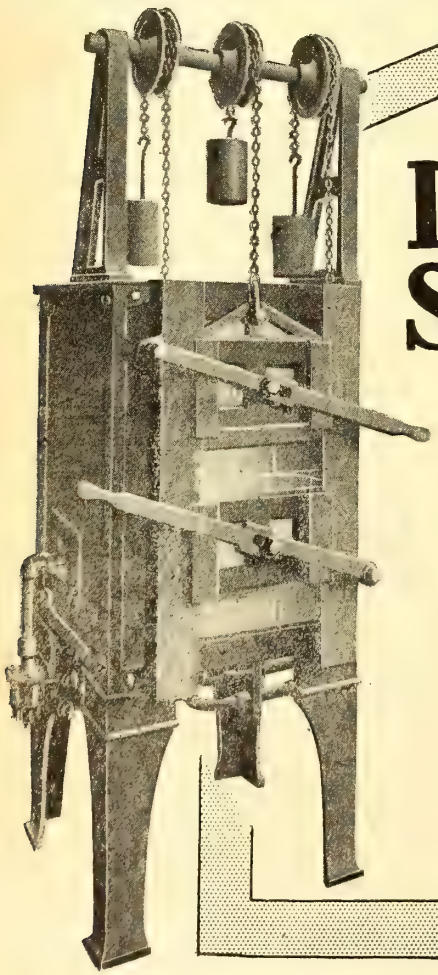
Humber

PREFERENCE for the Humber Car is proof of good judgment. Willingness to wait for one is evidence of sound patriotism. The necessity for this exercise of patience is to be found in the accompanying picture.



Part of Plane Construction Shop.

HUMBER LIMITED.



Davis High-Speed Steel Furnaces

The Davis "D.H.S.T." series of Gas-Fired Furnaces have been specially designed for the hardening of modern High Speed Steel Tools, and to provide the maximum of convenience and efficiency at the least practicable fuel cost.

The fixing element consists of Davis PATENT Air-Blast Burners, for gas at ordinary main pressure and air at 3 lbs. per square inch. Two chambers are provided, each fitted with rise-and-fall door complete with counter-balance gearing and actuating levers. A pre-heating temperature of 1000°C is attainable in the upper chamber, the lower one reaching 1500°C; whilst the flame does not impinge on the work.

Illustration shows the D.H.S.T. 200 Series (working spaces from 11 ins. × 9 ins. × 4½ ins. to 21 ins. × 18 ins. × 9 ins. Prices from **£39** complete. Write for lists F18 A. B. & C. (gratis)

Also Oven Furnaces, Muffles, Lead Melters, Crucibles, etc.

THE DAVIS FURNACE COMPANY

(Proprietors, The Davis Gas Stove Co., Ltd.)

Dept. Q, THE DIAMOND FOUNDRY, LUTON, BEDS.

Telegrams: "Castings, Luton." Telephone: Luton 260.

(*Continued from page* 1510).

Lt. C. H. Holcroft, R. War. R., T.F.; Temp. Lt. W. Douglas, Gen. List, March 1st. Sec. Lt. (temp. Lt.) V. V. Cadman, Middx. R., T.F., an Asst. Instr. in Gunnery (graded as an Equipt. Officer, 3rd Cl.), Schools of Aerial Gunnery, March 3rd.

Adjt.—Temp. Lt. F. J. Wood, attd. Suff. R., to be transfd. to R.F.C., Gen. List, and to be temp. Capt. (with pay and allowances as Lt.) while so empld., March 1st.

Park Comdr.—Capt. (temp. Lt.-Col.) W. E. G. Ord-Statter, R. Lanc. R., from a Spec. Appt. (graded as a Depot Comdr.), to relinquish his temp. rank, and to be temp. Maj. while so empld., Jan. 17th, seny. April 19th, 1917.

Schools of Instrn.—School of Technical Training.—Asst. Instr.—(Graded as an Equipt. Officer, 2nd Cl.).—Temp. Sec. Lt. A. Colledge, Gen. List, an Equipt. Officer, 3rd Cl., and to be temp. Lt. while so empld., March 22nd.

Park Comdrs.—And to be temp. Majs. while so empld.:—Capt. (actg. Lt.-Col.) H. R. Bently, Ches. R., to relinquish his actg. rank, and to be secd., Feb. 26th; temp. Capt. G. L. Paine, Training Res., and to be transfd. to R.F.C., Gen. List, March 1st.

War Office, April 22nd.

REGULAR FORCES.—Staff.—Attached to Hdqr. Units.—Brig.-Comdr.—The rank of Bt. Major (temp. Lt.-Col.) R. R. Smith-Barry, R.F.C., Spec. Res., is as now described, and not as in "Gazette" of Feb. 8th and March 18th.

Lt.-Col. H. R. Cumming, D.S.O., Durh. L.I., and to be temp. Brig.-Gen. while so empld., vice Col. (temp. Brig.-Gen.) D. E. Cayley, C.M.G., Worc. R., March 16th.

Establishments.—R.F.C.—Mil. Wing.—Staff Officer, 3rd Cl.—(Graded as a Staff Capt.)—Lt. G. C. Bateman, E. Kent R., T.F., to be secd., and to be temp. Capt. while so empld., March 18th.

Sqdn. Comdr.—Capt. G. D. Gardner, M.C., York R., T.F., from Flt. Comdr., and to be temp. Maj. while so empld., March 13th.

Flt. Comdr.—Lt. W. J. Corbishley, York and Lanc. R., from a Flying Officer, and to be temp. Capt. while so empld., March 21st.

Spec. Appt.—(Graded as a Flt. Comdr.)—Capt. R. H. C. Usher, M.C., Wilts R., Spec. Res., from a Special Appt. (graded as an Equipt. Officer, 1st Cl.), March 18th.

Schools of Instrn.—Armament School.—Instrs. in Gunnery.—(Graded as Equipt. Officers, 1st Cl.): Capt. P. S. Jackson-Taylor, Hereford R., T.F., from an Asst. Instr. in Gunnery (graded as Equipt. Officer, 2nd Cl.); Sec. Lt (temp. Capt.) P. H. R. Whittet, M.C., Spec. Res., an Equipt. Officer, 3rd Cl., and to retain his temp. rank while so empld.; Lt. G. A. Heath, Glouc. R., Spec. Res., from an Asst. Instr. in Gunnery (graded as Equipt. Officer, 2nd Cl.), and to be temp. Capt. while so empld. (Feb. 23rd).

Asst. Instrs. in Gunnery.—(Graded as Equipt. Officers), 2nd Cl.).—From Asst. Instrs. in Gunnery (graded as Equipt. Officers, 3rd Cl.): Capt. T. N. Weguelin, Hamps. R., T.F.; Temp. Lt. G. C. C. Pentland, Gen. List; Temp. Lt. W. R. Carrick, Gen. List; Lt. C. A. Hoy, M.C., Cyclist Bn., T.F.; Lt. E. L. French, R. Ir. Rif., Spec. Res.; Lt. A. L. C. Fuller, D. Gds. (Feb. 23rd); and to be temp. Lts. while so empld.: Temp. Sec. Lt. H. W. Hire, Gen. List; Temp. Sec. Lt. T. C. Sterndale-Bennett, Gen. List; Sec. Lt. E. A. B. Carter, Middx. R., T.F.; Sec. Lt. A. G. Berry, R. Suss. R., T.F.; Temp. Sec. Lt. A. F. Hambly, Essex R., and to be transfd. to R.F.C., Gen. List (Feb. 23rd).

Gen. List.—Flt. Serjt. J. E. Howell, from R.F.C., to be temp. Sec. Lt. (Jan. 3rd); 3rd Cl. Air Mechanics, from R.F.C., to be temp. Sec. Lts.: E. Milner, S. Scott, G. W. Thorpe (Jan. 11th); H. O'Connor, D. W. Holmes, B. I. Ward, N. P. Atkinson, G. F. Spaulding (Jan. 12th); A. Pinks, J. B. C. Knight (Jan. 14th); A. H. Ashton (Jan. 15th); L. F. Mead (Jan. 16th).

Infantry.—R. Suss. R.: Capt. J. L. Head, from Lond. R., T.F., attd. R.F.C., to be Sec. Lt. (April 23rd, seny. from May 4th, 1915).

* * *

The King has been pleased to approve of the following awards to the undermentioned officers in recognition of their gallantry and devotion to duty in the Field:—

The Distinguished Service Order.

Lt. (Temp. Capt.) W. B. Farrington, Notts and Derby R., Spec. Res., and R.F.C.

On five occasions during a period of three months he has led formations on long-distance bombing raids, in which, despite bad weather conditions, he has found and bombed his objectives with the most excellent results. All the operations in which he has taken part have proved highly successful, and his capabilities have stood out most prominently. He is a keen and most efficient pilot, and by his courage and determination has set a splendid example to his squadron.

Lt. (Temp. Maj.) W. R. Snow, M.C., R.F.C., Spec. Res.

During a flight lasting three hours and 40 minutes he successfully registered two siege batteries on a hostile battery, and observed 100 and 150 rounds respectively. On one occasion he made four trips and dropped 12 112 lb. bombs on two aerodrome objectives. He has carried out a large number of successful counter battery and trench registration shoots under exceedingly unfavourable weather conditions, and has at all times carried out his duties in a thoroughly keen and able manner, displaying a magnificent spirit of dash and energy.

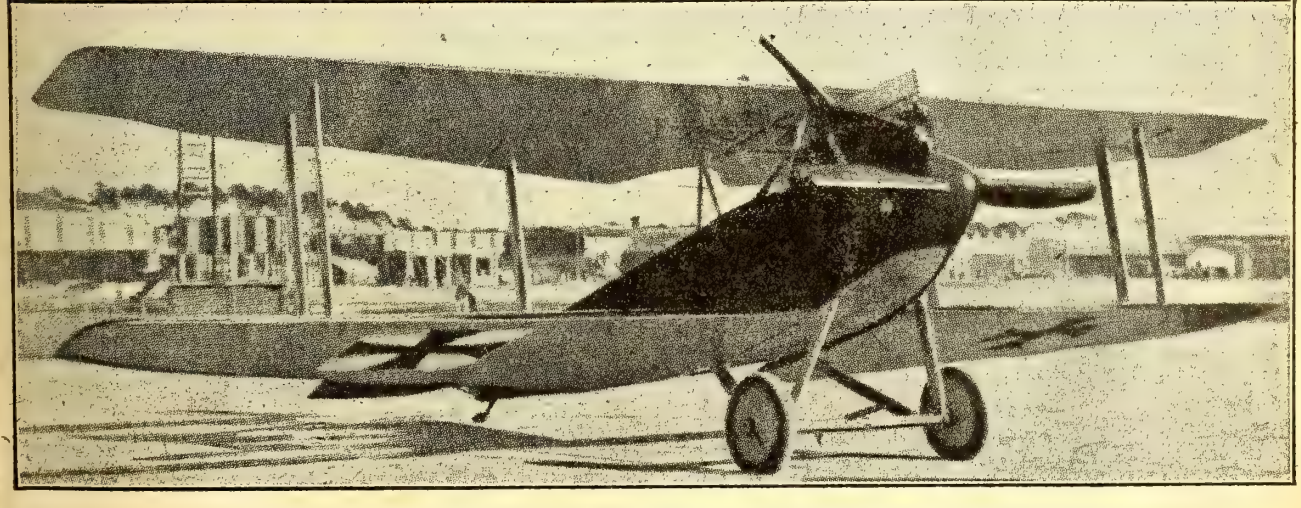
A Bar to the Military Cross.

Lt. (Temp. Capt.) H. H. Balfour, M.C., K.R.R.C., Spec. Res., and R.F.C.

On three occasions during one month he has destroyed one hostile machine and driven down two others completely out of control. On one occasion, flying at a very low altitude, under extremely adverse weather conditions, he carried out a reconnaissance, in which he bombed two guns and silenced them, bombed large bodies of troops in a market square, and fired into the hangars and huts in a hostile aerodrome, several casualties being observed. He has at all times shown himself to be a leader of exceptional dash and ability, and offensive patrols led by him have constantly attacked enemy formations with marked gallantry and determination. (M.C. gazetted May 26th, 1917.)

Lt. (Temp. Capt.) P. Huskinson, M.C., Notts and Derby R., and R.F.C.

During a period of six months he has destroyed two hostile machines and driven down seven others out of control. He has also, during an attack, carried out a ground patrol, flying at a very low altitude, during which he engaged a company of the enemy with machine-gun fire. On a later occasion, when firing at roads from a low altitude, he received a direct



Front View of the A G O Biplane. Note the curious tapering wings, and the single inner interplane strut to the rear spar, with two struts to the outer bay.

hit from a shell, which carried away a portion of his machine. He, however, regained control, and landing upside down in a shell-hole full of water was suspended in the water until nearly drowned. After his rescue, he remained all day working under shell fire until he had salved the engine. He has at all times proved himself to be a very gallant, keen, and able pilot. (M.C. gazetted July 27th, 1916.)

Sec. Lt. G. F. H. McElroy, M.C., R.G.A. and R.F.C.

When on an offensive patrol, observing a hostile scout diving on one of our aeroplanes, he opened fire, and sent down the enemy machine in an irregular spin out of control, when it finally crashed completely. Later in the same day he sent down another enemy machine in flames. On another occasion, when on offensive patrol, he singled one out of four enemy machines, and sent it down crashing to earth. On the same day he attacked another enemy machine, and, after firing 200 rounds, it burst into flames. On a later occasion he opened fire on an enemy scout at 400 yards range, and finally sent it down in a slow spin out of control. In addition this officer has brought down two other enemy machines completely out of control, his skill and determination being most praiseworthy. (M.C. gazetted March 26th, 1918.)

Temp. Capt. J. H. Norton, M.C., R.F.C.

While he was carrying out observation for an important artillery shoot, two hostile aeroplanes endeavoured to interfere. These he at once attacked and drove off, afterwards continuing his observation for the shoot, during which two hostile emplacements were destroyed. His dash and determination contributed greatly to the success of the operation. (M.C. gazetted May 25th, 1917.)

The Military Cross.

Sec. Lt. (temp. Capt.) J. M. Allport, R.F.C., Spec. Res.

On one occasion during night flying he made four trips during a period of four hours, dropping sixty bombs on his two objectives with excellent results. On a later occasion, whilst on photographing work, he was attacked by six enemy machines, but by skilful manœuvring he enabled his observer to shoot down in flames one enemy machine, another falling to pieces in the air. On several occasions he has carried out his tasks of photographing hostile battery positions and calibrating our long-range batteries on their targets under the most unfavourable conditions and with excellent results, showing a magnificent example to the whole squadron.

Temp. Sec. Lt. W. M. Blackie, Gen. List, and R.F.C.

When on a special reconnaissance of two small hostile works, he dived to within 300ft. of the ground, dropped his bombs near the works and then engaged with machine-gun fire a number of men who were running for cover. On a previous occasion he carried out a very successful night bombing raid under the most adverse conditions. He has always shown great determination, and has set a splendid example to his squadron.

Lt. F. E. Brown, R. Dub. Fus., Spec. Res., and R.F.C.

Whilst leading a patrol of five machines, on observing four hostile scouts diving on one of our formations, he at once engaged them, driving one of them down completely out of control, while his formation dispersed the others. Later, on sighting another hostile scout, he engaged it and forced it down spinning and out of control. While returning to his aerodrome, he observed an enemy two-seater, and, although his engine was running badly and might have failed him any moment, he attacked it and drove it down in a vertical nose dive. Previously to this he had driven down one other machine, which was seen to crash, and a third completely out of control. He is a most daring and skilful pilot.

Temp. Sec. Lt. A. K. Cowper, Gen. List and R.F.C.

Whilst leading a patrol of six machines he observed four hostile triplanes, one of which he attacked, succeeding in causing it to break up in the air. The remaining three enemy machines were destroyed by the rest of the patrol. On the return journey he encountered an enemy scout, and shepherding it by the most skilful piloting west of the lines, forced it to land undamaged on one of our aerodromes. On a later occasion, during three separate combats, he and his patrol brought down one machine completely out of control, and two others with their observers wounded, and later in the same day three other machines completely out of control. Previously to this he has assisted in destroying six other enemy scouts, displaying at all times the greatest courage and determination.

Temp. Lt. G. C. Cuthbertson, Gen. List, and R.F.C.

During a period of two months he has destroyed two enemy machines, one of which was a triplane, and sent down one other completely out of control. He has also carried out at very low altitudes several valuable reconnaissances at a long distance behind the enemy lines, and has set an example of the greatest pluck and determination to all ranks.

Sec. Lt. (Temp. Lt.) C. R. Davidson, H.L.I. and R.F.C.

He forced a hostile aeroplane to land, and, descending to a low altitude, despite heavy rifle fire, shot down one of the occupants as he was escaping from the machine. On two later occasions he forced an enemy machine to land, and drove down another, which was last seen diving into country in which it was impossible to land. Finally, though his ankle was fractured by a bullet during an air combat, he landed without injury either to his observer or his machine.

Temp. Lt. A. W. Hammond, R.E., attd. R.F.C.

When acting as observer on photographic work, though his machine was attacked by six enemy aeroplanes, he with great coolness shot down two of these. On two later occasions a large number of hostile battery positions were photographed, engaged and successfully silenced, as well as some of our long range batteries calibrated on hostile targets. The eminently satisfactory manner in which all these tasks were accomplished is due to this officer's keenness, conscientiousness, and devotion to duty.

Temp. Sec. Lt. E. W. A. Hunt, Gen. List, and R.F.C.

Whilst carrying out a bombing raid on an enemy aerodrome, on being attacked by twenty hostile machines, he engaged a hostile scout at close range and drove it down. On an earlier occasion he attacked and destroyed an enemy scout. He has carried out many most successful night bombing raids, dropping his bombs with good effect on trains and aerodromes and attacking troops and transport with machine-gun fire from low altitudes. He has shown the greatest determination and enterprise under the most difficult conditions.

Temp. Sec. Lt. D. F. Hurr, Middx. R., attd. R.F.C.

While he was on a special reconnaissance his machine was attacked when he was at a height of 5,000 feet over his objective by enemy aeroplanes, which he succeeded in driving off. Having descended to within 1,000 feet of the ground, he was heavily engaged by machine-gun fire, which wounded his observer, who collapsed. He then descended to within 400 feet of the ground and completed a comprehensive reconnaissance. He has at all times displayed the utmost disregard of danger and great devotion to duty.

Lt. (Temp. Capt.) D. G. B. Jardine, H.L.I. and R.F.C.

On two occasions when his formation was attacked by larger bodies of enemy scouts, he and his observer sent one of the enemy down in flames and two others completely out of control. During a period of three months he carried out two exceptionally long reconnaissances, during which he took a large number of photographs, containing most valuable information. His personal efforts and example are of the greatest value to the other pilots of the squadron.

Temp. Sec. Lt. C. F. King, Gen. List and R.F.C.

On five occasions during a period of three months he has sent down four enemy machines completely out of control, and has destroyed one other. Later, under very adverse weather conditions, he carried out a low reconnaissance, during which he engaged troops in a station, causing several casualties, fired into a body of the enemy entering a village from a height of 50ft., attacked four gun limbers, causing the teams to stampede, and finally dived on to a parade of troops, who scattered in all directions. He has displayed exceptional daring and skill, which, combined with a splendid dash and initiative, have set a fine example to his squadron.

Lt. (Temp. Capt.) T. J. C. Martyn, Lond. R., and R.F.C.

On numerous occasions during a period of five months he has reached his objectives and released his bombs with marked effect and with the most excellent results. His work has invariably been characterised by the greatest keenness, determination, and devotion to duty.

Sec. Lt. J. A. McCudden, Gen. List, R.F.C.

While on patrol he attacked single-handed two enemy triplanes, causing one to dive down steeply under control and the other to crash to the ground. On the day previous to this he destroyed a hostile two-seater, besides which he has driven down one other machine, which was observed to be destroyed, and four others completely out of control. He has always displayed great courage and determination.

Temp. Sec. Lt. G. McPherson, Gen. List and R.F.C.

When acting as observer on a special reconnaissance, he assisted in driving off an enemy aeroplane when his machine was at a height of 5,000 feet over his objective. Having descended to within 1,000 feet of the ground, he was wounded in the head from machine-gun fire, and collapsed. During the period when his pilot was descending still further to within 400 feet of the ground, he revived, and rendered further assistance in the reconnaissance, and on returning to his aerodrome was just able to make his report. He has at all times displayed the utmost disregard of danger and great devotion to duty.

Capt. J. A. Middleton, R.F.A. and R.F.C.

On one occasion he made two successive attacks on an enemy aerodrome, and, despite a mist and the intense activity

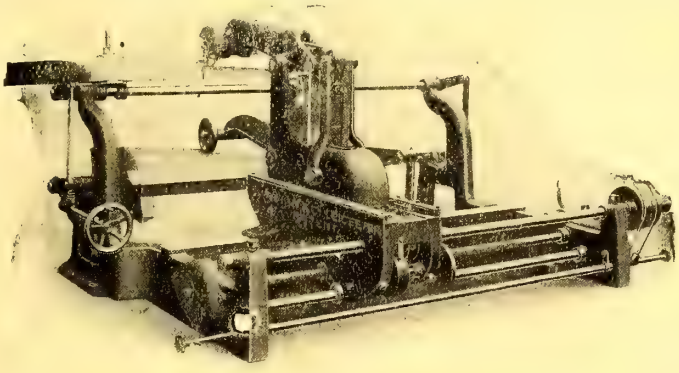
AUTOMATIC PROPELLER SHAPERS.

For Propellers having any number of blades.

Our latest machines have 2 speeds of traverse along the blade, viz.: 3¼in. and 5¾in. per minute.

An average size propeller can be shaped therefore in 30 mins.

Over 100 of these machines now in commission.



Made in 2 sizes to take propellers up to 12ft. and 14ft. dia.

Either machine deals with propellers 16in. wide and 9½in deep through hub.

PRICES.

12ft. type.. **£282 10s.**
14ft. ,, **£309 10s.**

An important feature is that WOODEN FORMERS ONLY are required. These can be easily made in your own shop and make the manufacture of small quantities of propellers a paying proposition on our machine.

WADKIN & CO., LEICESTER.

Telegrams: "Woodworker." 'Phone Nos. 3614 and 5.

W. G. TARRANT.

CONTRACTOR TO THE AIR BOARD.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

OFFICIAL ACCEPTANCE TESTS

LAND MACHINES.

S.P.A.D.	*Avro*
Sopwith	*Armstrong-Whitworth*
B.E.	*D. H. 4.*
Short	*Handley-Page*
Curtiss	*Bristol*
Mann, Egerton	*Vickers*
M. Farman	*Nieuport*
H. Farman	*Supermarine, &c.*
Morane	

SEAPLANES.

Short, Sopwith, America Boats, F.B.A. Boats, Curtiss Boats, Norman-Thompson, A. D. Boats, &c.

Private Aerodromes Surveyed and Pilots' Reports Furnished.

DELIVERY AND EXPERIMENTAL FLIGHTS
ON LAND MACHINES & SEAPLANES.

COMPLETE REPORTS FURNISHED.

Rates on application to
THE
PRODGER - ISAAC
AVIATION COMPANY
(C. B. Prodger and Bernard Isaac),
166, Piccadilly, London, W.1.
Telephone: Gerrard **278** (2 lines.)
Telegrams: "**Aeromnia**, Piccy, London."

CLIFFORD B. PRODGER
J. LANKESTER-PARKER,
and other Pilots.
Approved Admiralty Pilots
— for Acceptance Trials. —

INSURANCE.

WE are now in a position to quote low rates, through our brokers at Lloyd's, for the Insurance of Aircraft during ACCEPTANCE TRIALS AND DELIVERY FLIGHTS with an excellent and most comprehensive Policy. May we quote you for your new contracts?

SPECIAL ARRANGEMENTS with Sub-Contractors for HANDLEY-PAGE Type Land Machines or "AMERICA" Type Flying Boats

of hostile aircraft, dropped his bombs, obtaining two direct hits on the hangars. On a later occasion, during a gale, he made two journeys to bomb enemy rest billets, obtaining several direct hits on his objectives and attacking hostile transport on the roads with machine-gun fire. He has at all times shown great courage and skill, and has set an example which has been of great value to his squadron.

Sec. Lt. (temp. Capt.) L. Minot, R.F.C., Spec. Res.

When leading a formation of five bombing machines he attacked a hostile formation of 20 machines, and in the ensuing fight himself drove down two enemy machines completely out of control, whilst his observer destroyed another. Another four of the enemy formation were driven down completely out of control, and, as a result of his gallant leadership and determined action, his formation succeeded in getting back with the loss of but one machine. On a previous occasion he, in company with two other machines, attacked four of the enemy who were reinforced later by 13 scouts, and, after heavy fighting, drove down one enemy machine out of control, his formation returning safely.

Capt. R. N. Montagu-Stuart-Wortley, Yeo. and R.F.C.

On each of three occasions, when on offensive patrol, he has attacked and brought down in flames one enemy aeroplane, in addition to which he has sent down out of control three other hostile machines. He has displayed great courage and determination as a patrol leader.

Temp. Sec. Lt. S. A. Oades, Gen. List and R.F.C.

On six different occasions during four months he has driven down three enemy machines which crashed on reaching the ground, and has destroyed two others, causing them to descend in flames. A sixth machine, after he had fired 80 rounds into it, turned over, and went down spinning out of control, but owing to bad visibility it was not observed to crash. In addition to these, he has brought down another three hostile machines out of control, and has always shown the most magnificent dash, gallantry, and determination.

Sec. Lt. (temp. Capt.) E. R. H. Pollak, R.F.A. and R.F.C.

Whilst observing a shoot on a hostile battery he was attacked by two enemy triplanes, one of which he engaged and succeeded in driving off. On the second machine attacking him, his observer being wounded and his forward machine-gun being out of action, he put his machine into a spin down to within 500 feet of the ground, during which time flames began to come out of the engine. These ceased, however, when his machine was once again on a level keel, but on their breaking out again he landed his machine, and was partially successful in extinguishing them. He has always shown great coolness and determination under the most trying circumstances.

Temp. Sec. Lt. J. V. Sorsoleil, Gen. List and R.F.C.

While on patrol with three other scouts he engaged a hostile formation of ten scouts, driving one of these down. While climbing to rejoin his patrol he was attacked by an enemy scout, upon which he opened fire at close range, bringing it down spinning, with the result that it crashed to earth. He has also driven down one enemy machine in flames, and sent another crashing to earth, where it was destroyed. His gallantry and skill have been most conspicuous.

Temp. Sec. Lt. D. A. Stewart, Gen. List and R.F.C.

On one occasion, when returning from bombing an enemy dump, he was intercepted by a formation of 30 hostile machines. He attacked the leader and shot his machine down out of control, whilst his observer shot down another enemy scout. He then fired a burst at another large scout, which dived down vertically out of control. On his observer being hit whilst engaged with another four machines, he spun down 4,000 feet and dived for our lines. Later, when on photographic duty, he was attacked by five enemy scouts, three of which were accounted for by his observer and himself. In the face of heavy odds, his courage, skill, and fine fighting spirit have been most conspicuous.

Lt. (Temp. Capt.) G. H. B. Streatfield, Durh. L.I., Spec. Res. and R.F.C.

When on photographic work, accompanied by one other machine, he attacked and drove off seven hostile scouts, finally securing some very valuable photographs. On a previous occasion, while on the same duty, he drove off a patrol of five hostile aeroplanes and then continued and completed his photography. On four other successive occasions he successfully drove off numerous enemy aeroplanes, which attempted to interfere with his work. He showed splendid pluck and devotion to duty.

Temp. Capt. G. E. Thomson, Gen. List and R.F.C.

On one occasion when testing his machine he observed a hostile two-seater machine between himself and the lines. He dived on it and fired 60 rounds at a close range, rendering the observer insensible. He then pulled up under the tail of the enemy machine, fired another 30 rounds, and observed it going down in a slow spin. He has accounted for six enemy machines, and has rendered continuous gallant and valuable service.

Amendment.

The following is the correct description of an officer upon whom the Military Cross has been conferred :—

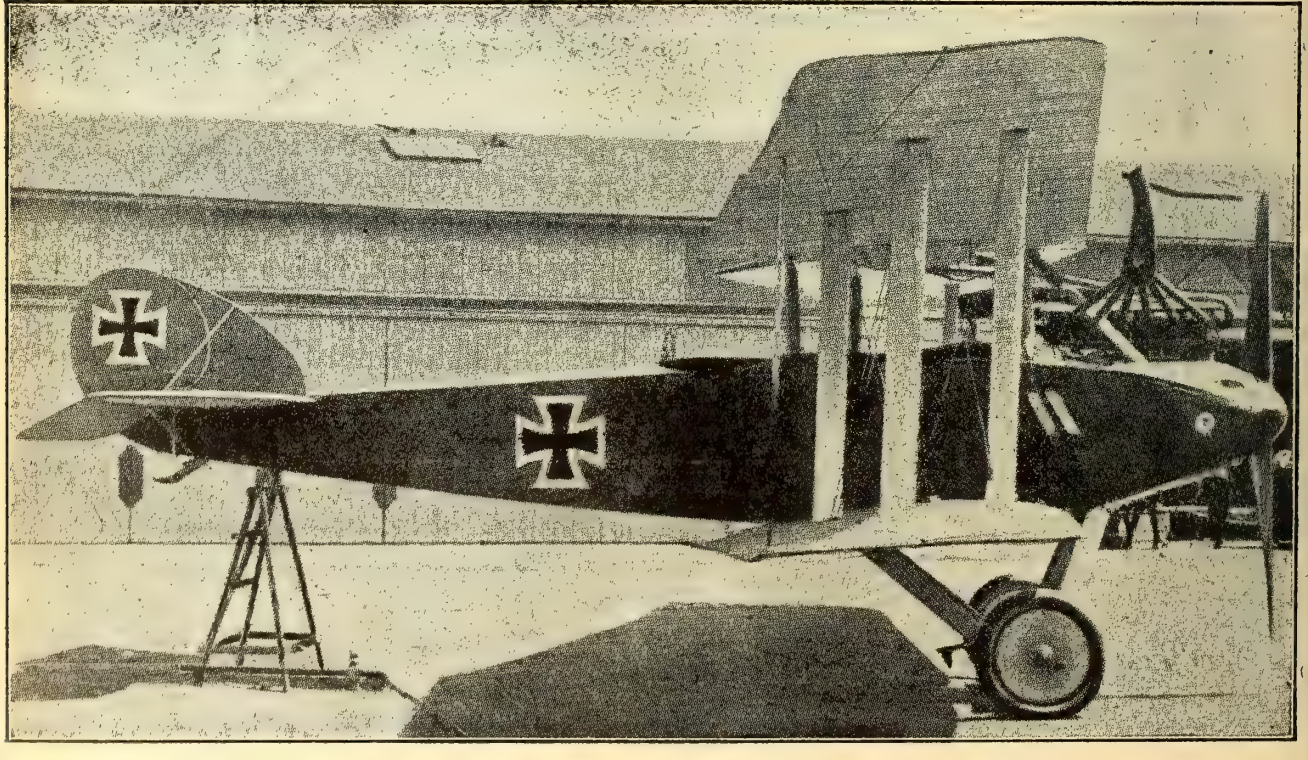
Lt. R. A. Austin, M.C., A.F.C. (M.C. gazetted March 26th, 1918).

FROM THE COURT CIRCULAR.

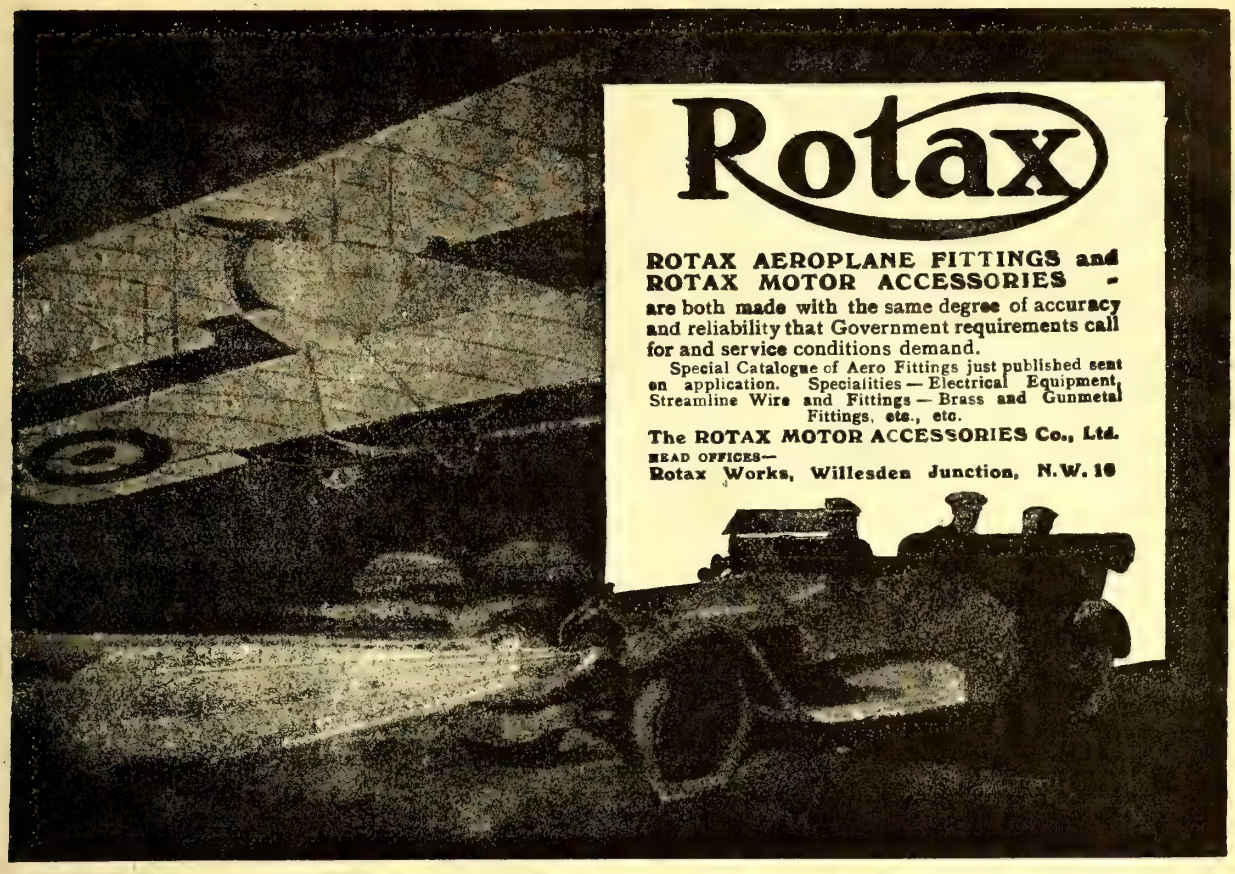
Windsor Castle, April 20th.

The King, attended by the Gentlemen in Waiting, went to London this morning.

The following officer had the honour of being received by the King, when His Majesty invested him with the Insignia of the



Side View of the A G O Biplane, illustrated on p. 1547. The precise position of the three interplane struts may be noted.



Rotax

ROTAX AEROPLANE FITTINGS and ROTAX MOTOR ACCESSORIES are both made with the same degree of accuracy and reliability that Government requirements call for and service conditions demand.

Special Catalogue of Aero Fittings just published sent on application. Specialities — Electrical Equipment, Streamline Wire and Fittings — Brass and Gunmetal Fittings, etc., etc.

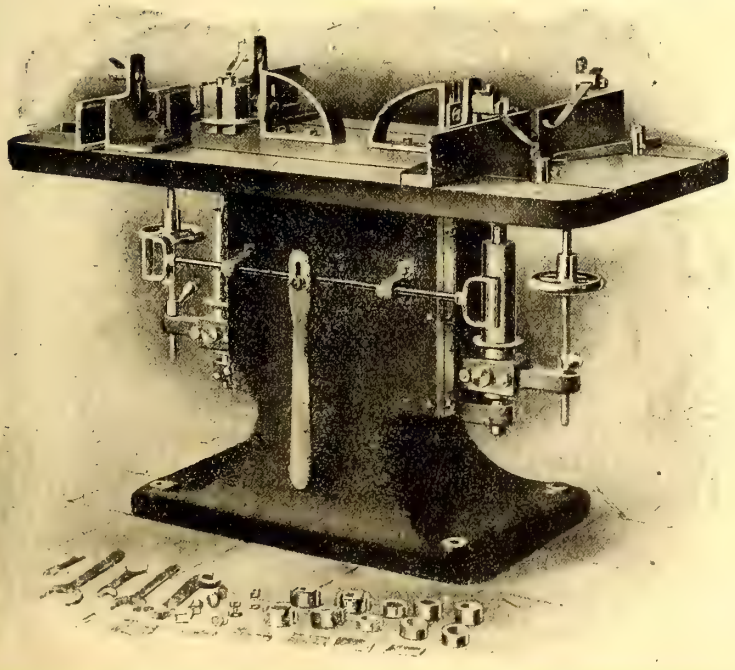
The ROTAX MOTOR ACCESSORIES Co., Ltd.

HEAD OFFICES—
Rotax Works, Willesden Junction, N.W. 10

HAIGHS

(OLDHAM) LIMITED

MANUFACTURERS OF ALL KINDS OF WOODWORKING MACHINERY.



D.D. Double-Spindle Circular Moulding Machine

Suitable for many varieties of irregular and circular work required in a Cabinet Maker's, Joiner's, or Builder's Works.

Globe Iron Works,
OLDHAM.

Telegrams: HAIGH OLDHAM.
Telephone: 1273 Oldham.

Haighs (OLDHAM) LTD.

Distinguished Service Order and the Military Cross :—Maj. Justin Herring, R.A.F.

The King then conferred decorations as follows :—

The Distinguished Service Cross and Bar.—Capt. Irwin Clarke, R.A.F.

The Military Cross and Bar.—Lt. Fred McCall, Can. Inf., attd. R.A.F.

The Military Cross.—Capt. Jeffrey Home-Hay, R.A.F. ; Capt. Evans McKay, R.A.F. ; Lt. Gerald Ferguson, R.A.F.

OFFICIAL COMMUNIQUES.

MILITARY.

G.H.Q. Communiqués.

April 16th, 7.54 p.m.—On the 15th inst. the bad weather continued, and only permitted flights at a low altitude.

Over four tons of bombs were dropped by our aeroplanes on different targets. In one case a direct hit was obtained with a heavy bomb on a large column of hostile infantry. No German aircraft were encountered.

One of our machines is missing.

April 17th, 9.5 p.m.—On the 16th instant the mist that has hung over the lines during the last few days turned to drizzle, making flying almost impossible. Movements on the battle front were, however, watched by our machines flying at a very low height and a few bombs dropped.

One hostile machine was brought down and another landed behind our lines.

One of our machines is missing.

April 18th, 8.37 p.m.—During the morning of the 17th inst. there was a slight improvement in the weather, but before mid-day rain and mist again set in. Our aeroplanes were active throughout the day on the Meteren-Wytschaete front bombing the enemy's troops and harassing them with machine-gun fire. Over 500 bombs were dropped by us from a very low height.

There were a few fights early in the day, in the course of which two hostile machines were brought down and one other was driven down out of control.

Four of our aeroplanes are missing.

April 19th, 7.32 p.m.—On the 18th inst. the weather made it impossible during the day to do more than carry out low reconnaissances and to drop a few bombs in the battle area.

At night nine tons of bombs were dropped on Bapaume, Armentières, Warneton, and on the railway junction at Chaulnes.

All our machines returned.

April 20th, 7.50 p.m.—There was no improvement in the weather on the 19th instant, but a certain amount of flying was done by our aeroplanes between storms of rain and snow.

Reconnaissances were carried out at a low height, and four and a half tons of bombs were dropped on Thourout Railway Station, Engel ammunition dump, and targets in the battle area.

Only a few indecisive combats took place.

None of our machines is missing.

After dark our night-flying squadrons were very active.

Sixteen tons of bombs were dropped by them on Armentières, Warneton, Estaires, Bapaume, and the railway junction at Chaulnes. Direct hits were observed on four trains, one of which, judging from the explosions caused, was undoubtedly full of ammunition.

All our machines returned.

April 21st, 8.55 p.m.—The weather improved on the 20th instant, but thick clouds prevented flying at high altitudes. A number of reconnaissances were carried out by our aeroplanes, and some observation work was accomplished in co-operation with the artillery.

Twelve tons of bombs were dropped by us during the day on various targets, including Menin, Armentières, and Thourout railway junction.

Owing to the improvement in the weather, more fighting took place in the air than during the last few days. Six hostile machines were brought down, and three others were driven down out of control.

Three of our machines are missing.

During the night our night-flying squadrons bombed Bapaume, and also the enemy's rest billets and roads leading to the front. Hostile railway junctions were also attacked at Chaulnes, where a large fire was caused, at Juniville (20 miles north-east of Reims), and at Bétheniville.

A total of over 11 tons of bombs were dropped, and all our machines returned.

April 22nd, 9.55 p.m.—After a long spell of stormy weather, which greatly hampered aerial work, the 21st inst. brought a change, and our aeroplanes were able to be in the air from dawn till dark.

The good visibility favoured our artillery, photographic, and long-distance reconnaissance machines.

Bombing was carried out by us incessantly on the whole front. Over 23 tons of bombs were dropped on Thourout railway station, Menin, Armentières, Chaulnes, and various other targets. Thousands of rounds of machine-gun ammunition were fired by our low-flying machines.

The enemy's machines were seen in large numbers, but were not aggressive. Eleven German machines were brought down in air fighting, and six others were driven down out of control. A hostile observation balloon was also destroyed. Our anti-aircraft fire shot down two other hostile aeroplanes.

Five of our machines are missing.

The pilot of one of the hostile machines which was brought down in combat, and fell in our lines, was the well-known German aviator and fighter, Rittmeister Freiherr M. von Richthofen, who claimed to have brought down 80 Allied machines. His body has to-day been buried with full military honours.

During the night of the 21st instant our night-flying machines again bombed Armentières, Bapaume, Chaulnes railway junction, and Péronne, dropping in all nine and a half tons of bombs.

All our machines returned.

War Office Communiqué.

April 18th.—The G.O.C. Italy reports :—

Yesterday was the first fine day for some 10 days, and led to much aerial activity. Several successful long-distance reconnaissances were carried out. There was heavy fighting in the air ; 11 enemy machines were destroyed and one driven down out of control. None of our machines is missing. In addition, one enemy aeroplane was brought down to-day by our anti-aircraft fire.

THE CASUALTY LIST.

NAVAL.

Reported April 18th.

Previously reported Missing, now Officially Presumed to have been Killed.—Dixon, Flt. Lt. J. F., D.S.C., R.N.
Duckworth, Flt. Sub-Lt. C. G., R.N.
Hall, Flt. Lt. H., R.N.
Grace, Flt. Sub-Lt. E. V. J., R.N.
Richardson, Flt. Sub-Lt. S. S., R.N.

Previously reported Missing, now reported Prisoner in Germany.—Campbell, Flt. Sub-Lt. K. D., R.N.

Reported April 22nd.

Previously reported Missing, now reported Killed.—Dixon, Flt. Sub-Lt. A. J., R.N.

Previously reported Missing, now officially presumed to have been Killed.—Sharman, Actg. Flt. Comdr. J. E., D.S.C., R.N.
Culling, Flt. Lt. T. G., D.S.C., R.N.
Swinburne, Flt. Sub-Lt. T. R., R.N.
Potvin, Flt. Sub-Lt. J. E., R.N.
Akers, Flt. Sub-Lt. F. W., R.N.
Bennetts, Flt. Sub-Lt. E. A., R.N.
Weir, Flt. Sub-Lt. C. H., R.N.
Lowther, Flt. Sub-Lt. C., R.N.

MILITARY.

Reported April 17th.

Australian Force.—Wounded.—Jones, Lt. G., Aust. Fl. Corps ; Millington, Sec. Lt. V. E., Aust. Fl. Corps ; Wright, Lt. J. W., Aust. Fl. Corps.

Reported April 18th.

Canadian Force.—Killed : Lawlor, Lt. F. J., Que. R., attd. R.F.C.

Accidentally Killed.—Brooks, Lt. R. E., Que. R., attd. R.F.C. ; Stacey, Lt. J. R., W. Ont. R., attd. R.F.C.

Missing.—Findley, Lt. T. I., Can. F.A., attd. R.F.C. ; Paterson, Capt. G. I., Sask. R., attd. R.F.C.

Reported April 19th.

Wounded.—McConnachie, Sec. Lt. W. W., R.F.C.

Australian Force.—Previously reported Killed, now reported Died of Wounds.—Sell, Sec. Lt. L., A.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Nicholls, Sec. Lt. W. H., A.F.C.

Previously reported Missing, now reported Prisoners in Turkish Hands.—Hancock, Lt. F., A.F.C.
Poole, Lt. A. A., A.F.C.

Reported April 20th.

Correction.—Missing.—Miller, Sec. Lt. C., R.F.C., should read Miller, Sec. Lt. G., R.F.C

Australian Force.—Accidentally Killed.—Burton, Lt. E. W., A.F.C.
Grant, Sec. Lt. E. D., A.F.C.

Wounded.—Adams, Sec. Lt. A. W., A.F.C.

Missing.—Feez, Lt. C. M., A.F.C. ; Flight, Sec. Lt. O. T., A.F.C. ; Hosking, Sec. Lt. T., A.F.C.

Reported April 22nd.

Killed.—Somerville, Sec. Lt. H. A., R. Sus. R., attd. R.F.C.

Previously reported Missing, now reported Killed.—Dyer, Sec. Lt. H. A., R.F.C.

Died of Wounds.—Seaholme, Sec. Lt. M., R.F.C.

Wounded.—Curtis, Sec. Lt. W. A., R.F.C. ; Deeks, Sec. Lt. H. C., R.F.C. ; Marsden, Sec. Lt. C., R.F.C. ; Palmer, Sec. Lt. C. F., R.F.C. ; Robin, Sec. Lt. G. D., R.F.C. ; Sims,

Finding the Right Steel.

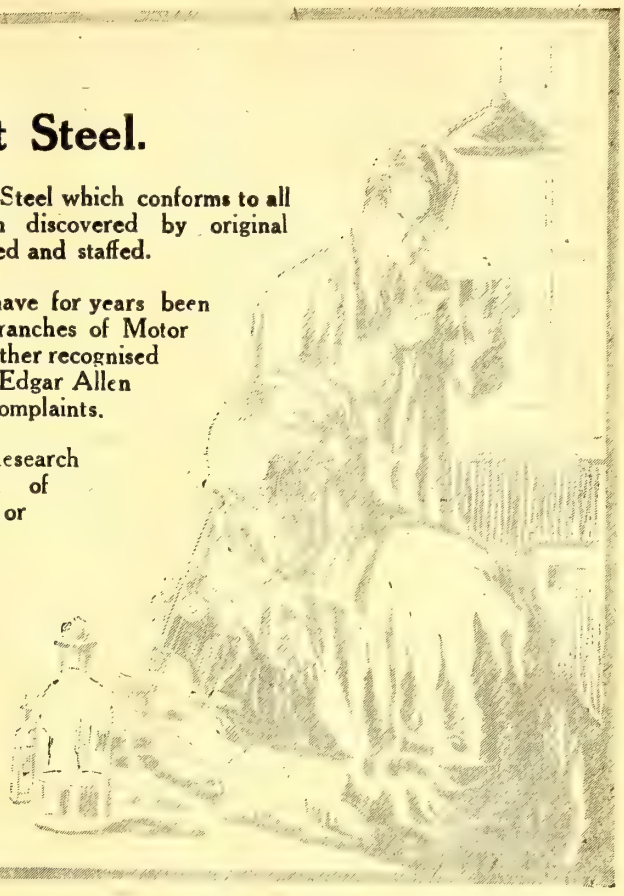
IN EVERY engineering process there is one Steel which conforms to all the technical requirements. It has been discovered by original research work in a laboratory suitably equipped and staffed.

The Edgar Allen Research Laboratories have for years been employed in defining the correct Steels for all branches of Motor and Aircraft manufacture. All Government and other recognised specifications are complied with. By specifying Edgar Allen Steels, engineers will be relieved of all anxiety and complaints.

The services of the Edgar Allen Research Laboratories are placed at the free disposal of Engineers submitting confidentially any problems or difficulties.

Allen's Catalogue D (Motor and Aircraft-Steels) gives the specification and test-numbers of all steels required. (Post Free.)

Edgar Allen & Co. Ltd.
Imperial Steel Works, Sheffield.



WARING & GILLOW LTD
Furnishers & Decorators to H.M. the King

CONTRACTORS
TO THE
WAR OFFICE AND ADMIRALTY.

LIVERPOOL HAMMERSMITH LANCASTER

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

HEAD OFFICE
OXFORD ST. W.1

TELEPHONE No.:
HAMMERSMITH 1980

TELEGRAMS:
"Warings Factories, Hammersmith."

Lt. B. W., E. Lan. R., attd. R.F.C.; Smith, Sec. Lt. William Hart, R.F.C.; Streatfeild, Capt. G. H. B., M.C., Durh. L.I., attd. R.F.C.

Missing.—Lindsay, Sec. Lt. A. T. W., R.F.C.; Pope, Sec. Lt. A. D., R.F.C.

Canadian Force.—Previously reported Missing, now reported Killed.—Paterson, Capt. G. I., Sask. R., attd R.F.C.

Previously reported Missing, now reported Killed or Died of Wounds.—Skelton, Lt. E. K., Can. F.A., attd. R.F.C.

Wright, Lt. D. C., W. Ont. R., attd. R.F.C.

Previously reported Killed, now reported Died of Wounds.—Lawlor, Lt. F. J., Que. R., attd. R.F.C.

Previously reported Missing, now reported Wounded.—Findlay, Lt. T. I., Can. F.A., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Wensley, Lt. J. H., Sask. R., attd. R.F.C. Reported April 23rd.

Previously reported Missing, now reported Killed.—Baker, Sec. Lt. E. T., R.F.C.

Wounded.—Hammond, Lt. A. W., M.C., R.E., attd. R.F.C.; Herring, Sec. Lt. R. S., Lond. R., attd. R.F.C.; McLeod, Sec. Lt. A. A., R.F.C.; Warren, Sec. Lt. C. F., R.F.C.

Missing.—Reading, Sec. Lt. V. J., R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in German Hands.—Dusgate, Sec. Lt. R. E., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Allen, Sec. Lt. J. M., R.F.C.
Clutterbuck, Sec. Lt. L. C. F., R.F.C.
Crosbee, Sec. Lt. C. H., R.F.C.
Doyle, Sec. Lt. D. C., R.F.C.
Fenton, Sec. Lt. C. B., R.F.C.
Ferguson, Lt. J. A. A., R.F.C.
Flere, Sec. Lt. C. H., R.F.C.
Foster, Lt. P. La T., R.F.C.
Logan, Sec. Lt. G. C., R.F.C.
Marsh, Sec. Lt. G. R. T., R.F.C.
Shakesby, Sec. Lt. C. V., E. Yorks R., attd R.F.C.
Sparks, Sec. Lt. H. J., M.C., K.R.R.C., attd. R.F.C.
Toplis, Sec. Lt. R. H., R.F.C.

* * *

Casualties among N.C.Os. and Men.
The Dates are those of the Official List.

Wounded.

April 9th.—R.F.C.—Annis 29606 2nd Cl. Air Mech. V. A. Birmingham).

Missing.

April 9th.—R.F.C.—Sutcliffe 407086 Cpl. F. R. (Melksham).

Previously reported Missing, now reported Wounded and Prisoner of War in German Hands.

April 8th.—R.F.C.—Smith 328 Serjt. H. O., M.M. (Clapham Common, S.W.).

The following officers who were prisoners of war in Germany, have arrived in Holland for internment:—Broder, Capt. P. A., Worc. R., attd. R.F.C.; Crabbie, Lt. W. M., R.F.A. and R.F.C.; Eberli, Lt. F. H., R.G.A., attd. R.F.C.; Greenhow, Lt. M. W., W. Yorks. R., attd. R.F.C.; Leech, Capt. J. C., Hussars, attd. R.F.C.; Macpherson, Lt. R. C., Black Watch, attd. R.F.C.; Sanford, Capt. S. A., Dragoon Gds., attd. R.F.C.; Scholefield, Lt. E. R. C., R.F.C.; Spratt, Capt. N. C., R.F.C.; Stott, Capt. J. N. S., Dragoon Gds., attd. R.F.C.; Stubbs, Lt. H. B., R.F.C.; Sugden-Wilson, Capt. W. H. Yeo., attd. R.F.C.; Tudor Hart, Lt. W. O. T., Northd. Fus., attd. R.F.C.; Weir, Lt. A. G., R.F.C.

Indian Army.—Hankin, Capt. H. M., Cav., attd. R.F.C.

* * *

The "Times" correspondent writing from The Hague states that the following officers were among those who arrived on April 18th for internment in Holland:—

Adams, Sec. Lt. F., R.F.C.; Alexander, Lt. E. H. E. J., K.O.Y.L.I. and R.F.C.; Burnie, Sec. Lt. A. I., Buffs, attd. R.F.C.; Collier, Sec. Lt. A. C., R. Lan. R. and R.F.C.; Formilli, Capt. G. C., R.G.A., attd. R.F.C.; Grantham, Lt. V. M., R.F.C.; Gray, Capt. K. W., Wilts R., attd. R.F.C.; Leeson, Lt. D., Can. Inf. attd. R.F.C.; McEwen, Lt. J. G., R.F.C.; Mansell-Moullin, Lt. O., R.F.C.; Porter, Capt. G. T., R.F.A. and R.F.C.; Russell, Lt. A. L., R.F.C.; Slade, Lt. R. J., A.C.C., attd. R.F.C.; Somervell, Lt. W. E., L. N. Lan. R., attd. R.F.C.; Strong, Capt. C. C., Lond. R., attd R.F.C.; Strover, Capt. E. J., 3rd Brahmans, attd. R.F.C.; Wilkin, Sec. Lt. R.F.C.

* * *

B., D.C.L.I., attd. R.F.C.; Wilson, Capt. C. B., Hussars and

Reuter's correspondent at The Hague reports that the latest list of British officers prisoners of war arriving in Holland for internment includes the following: Fairbairn, Sec. Lt. J., R.F.C.; Morrison, Lt., R.F.C. (65th Sqdn.); Snook, Capt. C. W., R.F.C.

* * *

Capt. Sidney Smith (Flt. Comdr.), R.F.C., has been missing since April 6th. Any information from officers and men will be gratefully received by Mr. and Mrs. Arthur Smith, of Morningside, Aldershot.

PERSONAL NOTICES.

NAVAL.

Death.

DIXON.—On the 13th inst., at a nursing home, Josephine, the dearly-loved wife of Ernest Harry George Dixon, R.N.A.S., of 70, Kensington Gardens Square, W., on active service with the British Aegean Squadron, aged 29 years.

* * *

The "Times" correspondent states that Flt. Lt. J. F. Hay, R.N., was among those officers who arrived in Holland for internment on April 18th.

MILITARY.

Deaths.

AITCHISON.—Lt. Douglas James Aitchison, R.F.A., attd. R.F.C., who died on April 17th at the R.F.C. Hospital, Hampstead, as the result of blood-poisoning following an aeroplane crash on active service, was the younger surviving son of the late James Aitchison and of Mrs. Aitchison, of Kismet, Beckenham.

BRABROOK.—Sec. Lt. Edward John Brabrook, R.F.C., who died of wounds received in action on April 20th, was the only son of the late Edward Frederick Brabrook, LL.B., and grandson of Sir Edward William Brabrook, C.B.

GRANT.—Lt. Eric Duncan Grant, whose death was announced last week, was at the time of his death engaged as an instructor at an Australian aerodrome. He gave promise of brilliant work at the front, where he was about to proceed.

GRIGSON.—Sydney Mark Grigson, A.F.C., who died on April 17th at the Central Military Hospital, Aylesbury, was the younger son of Dr. R. E. and Mrs. Grigson, Sydney, New South Wales. He was 20 years of age.

KING.—Lt. William Hugh King, N. Staffs. R., attd. R.F.C., who was killed on April 11th through an accident when returning from a raid, was the eldest son of Mr. and Mrs. William Hedley King, of Inglis Road, Colchester. Born in 1894, he was educated at the Royal Grammar School, Colchester, and on leaving went to Germany, where he acquired a thorough knowledge of both the French and German languages. He adopted engineering as his profession, and was articled to Davey, Faxman, and Co., Ltd., of Colchester.

He enlisted immediately after the war broke out, and soon afterwards obtained a commission, being gazetted second lieutenant in the Essex (Cyclist) Battalion; he was promoted lieutenant in July, 1917. He went to France in March, 1917, and was for some time attached to the 2/5th North Staffordshire Regiment and later was engaged for some months at the headquarters of the XV. Corps, on account of his fluent knowledge of both the French and German languages. In November, 1917, he obtained a transfer as observer in the Royal Flying Corps, and returned to England for a course of training. He passed all examinations with distinction and was highly commended, and left for the front again early last month.

MACRAE.—Capt. John Nigel MacRae, R.A.F., who was killed in a flying accident on active service on April 11th, aged 22, was the younger son of Stuart MacRae and Mrs. MacRae, Handley House, Newark. He was educated at Messrs. Carse and Sams, Brighton, and at Malvern College.

At the outbreak of war he was in the Sherwood Rangers Yeomanry, which he left shortly afterwards to join a battalion of the Black Watch commanded by his uncle, Col. MacRae Gilstrap of Eilean Donan. He had for a long time wished to fly, and in October, 1915, he joined the Royal Flying Corps. He got his wings on February 1st, 1916, and went out to France the following month for eight months. He was gazetted flight commander in January, 1917, and after instructing in England for 14 months, again went to the front on March 5th last.

MAYBERY.—Capt. Richard Aveline Maybery, M.C. (with bar), Lancers, attd. R.F.C., who was previously reported missing and is now reported killed, was born at The Priory, Brecon, and was 22 years of age. He was educated at Connaught House, Weymouth, and Wellington, Berks, distinguishing himself at games at both places. From Wellington he won a prize cadetship at Sandhurst, and after two terms passed out fifth, winning the first prize for field engineering, tactics, and strategy.

He was gazetted to the — Lancers in September, 1913, and joined his regiment at Rawal Pindi. He served through much fighting on the Indian frontier, being part of the time A.D.C. to Gen. Crocker. He was dangerously wounded in the fight at Shrabkadr, and, being unable for some time to sit a horse, he took up flying. He was sent to Egypt, and after a short course in England, where he made a record flight, he went out to France in June, 1917, and won the M.C. in July and a Bar in October.

His C.O. in the R.F.C. writes: "Capt. Maybery was, I think, the bravest and most dashing air-fighter I have ever come across, and, of course, his career here has been brilliant

JEWELLERS BY APPOINTMENT SILVERSMITHS



Patent No. 11876/15

THE "MILITARY" LUMINOUS WATCH.

A THOROUGHLY reliable and practical luminous watch, indispensable for Naval or Military Service. The "Military" Luminous Watch is the only Screw Case Silver Watch fitted with a "hunter" cover, and is the exclusive patent of The Goldsmiths and Silversmiths Company, Ltd.

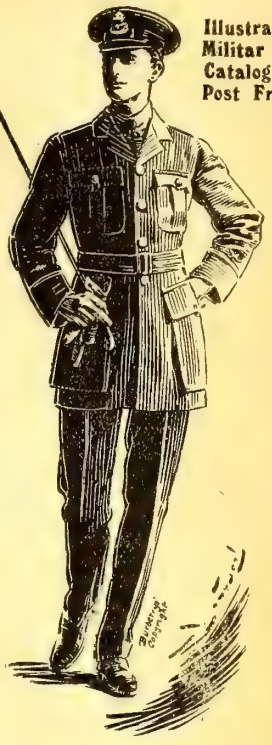
As illustrated. £4 12 6 Without Cover. £3 15 0

THE GOLDSMITHS & SILVERSMITHS COMPANY, LTD. with which is incorporated The Goldsmiths' Alliance Ltd Established 1751

Only one Address (no branches):

112, REGENT STREET, LONDON, W.

BURBERRY R.A.F. KIT



Illustrated Militar Catalogue Post Free.

BURBERRYS supply correct and well-tailored Uniforms, Weatherproofs, Air-Warms, Fur Undercoats, Leather Coats, British Warms, Caps, and every detail of R.A.F. dress and equipment, at reasonable prices

BURBERRY KIT, made in special Burberry-woven and proofed cloths, in textures suitable for France, or the Near or Far East, provides an effective safeguard against wet or wind, and, whilst light-weight, is the strongest and most comfortable equipment for facing the atmospheric conditions of varying altitudes.

Service Weatherproofs.
During the War BURBERRYS Clean and Re-proof Officers' "Burberrys," Tielockens, Burfrons, and Burberry Air-Warms FREE OF CHARGE.

Complete Outfits in 2 to 4 Days, or Ready-to-Wear.

BURBERRYS Haymarket S.W. 1. LONDON
8 & 10 Bd Malesherbes PARIS; also Provincial Agents

Of special interest to Government Contractors.

J.B.BROOKS & Co Ld

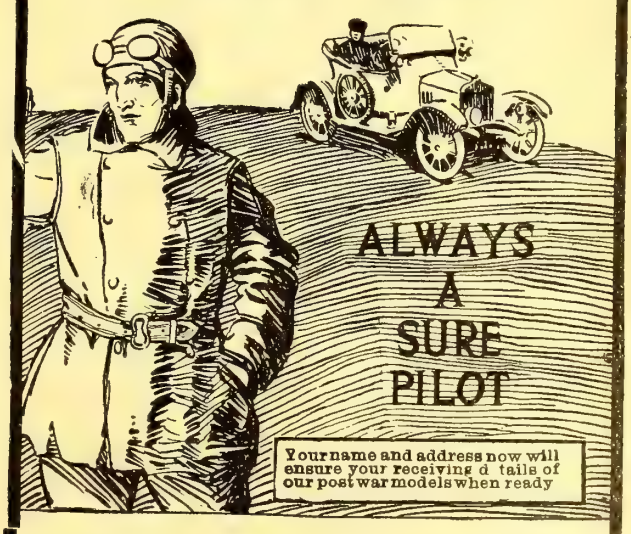
Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.
And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments, and Cases of

LEATHER

J.B.Brooks & Co Ltd
104 Criterion Works
Birmingham.

1191

The All British STANDARD Standard LIGHT CAR



Your name and address now will ensure your receiving details of our post war models when ready

The Standard Motor Co., Ltd., Coventry.

London Agents: The Pytchley Autocar Car Co, Ltd., 216, Gt. Portland Street, W.

He set a wonderful example to the newer pilots. He has done a tremendous lot of good in this war. He and Capt. Ball and Lt. Rhys Davids did more harm to the moral of the German Flying Corps than any other 15 pilots between them. They all, always, took on any odds—they were too brave and reckless."

MEREDITH.—Sec. Lt. Owen Watkin Wynn Hardinge Meredith, R.F.C., was the only child of the late the Venerable Thomas Meredith, late vicar of Wolston and Archdeacon of Singapore, and of Mrs. Meredith, of Park Road, Leamington. He was educated at Harrow and Cambridge University. He distinguished himself in all mechanical examinations in London, and was an excellent shot when going through his course of gunnery. At an aerodrome in England he made a record for high flying. He obtained his wings in July, 1917, and went out to the front in October, 1917. He was reported missing on Nov. 20th, 1917, near Cambrai, and is now known to have been killed in action on that date at the age of 24.

ROWDEN.—Maj. and Sqdn. Comdr. Cuthbert Roger Rowden, M.C., Worcs. Regt. and R.A.F., who was accidentally killed whilst flying in Essex on April 20th, was the husband of Frances Rowden (née Jobson), and only son of A. Roger Rowden, Hillend, Eastnor, Ledbury. He was 21 years of age.

WHITEHEAD.—Sec. Lt. Eric Alfred Whitehead, R.F.C., aged 19, was reported missing on March 13th. Later accounts make it clear that he was killed on that day while on patrol duty. He was the younger son of Professor and Mrs. A. N. Whitehead, of 97, Coleherne Court, South Kensington, and was born at Cambridge, educated at Mr. Gladstone's preparatory school, Cliveden Place, S.W., and Westminster School, and had been admitted 'to Balliol College, Oxford. He served for one year in the R.F.C., being employed in England as an instructor after obtaining his pilot's wings. At his own request he was sent to the front in February this year.

Marriage.

WHITFIELD—BYRNE.—On April 18th, at Christ Church, Broadway, Westminster, Lt. J. Miller-Whitfield, R.E., attd. R.A.F., of Toronto, Canada, was married to Nancy Adele, daughter of Mrs. W. H. Byrne, of Ealing, by the vicar, the Rev. R. J. Campbell.

Births.

DARWEN.—On April 17th, at 18, Dunstan Road, Hampstead, the wife of Lt Jack Darwen, R.F.C., of a daughter.

PLANT.—On April 19th, at Euston, Norfolk, the wife of Lt. L. H. Plant, R.F.A., attd. R.A.F., of a daughter.

WARING.—On April 16th, at 80, Ashley Gardens, S.W., the wife of Capt. C. H. Waring, Hussars and R.A.F.—a son.

AIR FORCE.

Deaths.

GASTER.—Sec. Lt. Gaster, R.A.F., was killed while flying in Scotland on April 21st.

MILDMAY.—Sec. Lt. Bouverie Walter Mildmay, R.A.F., who was reported killed on April 16th, was the only son of the Rev. and Mrs. Arundell St. John Mildmay, of Old Wolverton Vicarage, Bucks. He was 19 years of age.

MOONEY.—Sec. Lt. Mooney, an American Army officer, attd. R.A.F., was killed on April 22nd while flying in Surrey. His engine suddenly stopped and the machine fell on a railway, where it caught fire. A train which was due to pass the spot where the accident happened was stopped by a signalman.

PALMER.—Lt. Bryan Barrington Palmer, R.A.F., who was killed while flying on April 17th, was the elder son of Mr. and Mrs. T. H. B. Palmer, of 1, Sutton Court, Chiswick, late of the Ivy House, Bushey, Herts. He was 19 years of age.

ROBINSON, CLAYTON, and HOWELL.—Lt. Harry Estcourt Robinson, R.A.F., and Sec. Lt. John Alfred Clayton, R.A.F., while flying over Yorkshire on April 21st, came into collision at a height of 2,000ft. with another aeroplane piloted by Lt. Evan Idris Howell, R.A.F.

Both machines crashed to the ground, the three occupants being killed instantly.

Lt. Harry Estcourt Robinson, R.A.F., was the son of Mrs. Venetia Jefferson, of Drayton House, Colebrooke Avenue, West Ealing, and of the late Maj. James Estcourt Robinson, E. Lancs. Regt. He was 19 years of age.

Engagement.

HAY—LIDDELL.—A marriage has been arranged, and will take place on May 16th, between Capt. John Crawford Matthew Hay, R.A.F., second son of Professor Matthew Hay, M.D., LL.D., of Aberdeen University, and Mrs. Matthew Hay, and Mary Monica, second daughter of Mr. and Mrs. John Liddell, of Sherfield Manor, Basingstoke.

Marriages.

GOODFELLOW—BOSTON.—On April 17th, at Trinity Wesleyan Church, Southport, Capt. Alan Goodfellow, R.A.F., son of Mr. and Mrs. B. Goodfellow, of Birkdale, and grandson of the late Reuben Spencer, of Manchester, was married to Christine Mary, daughter of the late John Boston and Mrs. Boston, of Birkdale, and granddaughter of the late James S. Sutcliffe, of Bacup, by the Rev. Allan Spencer, assisted by the Rev. Scott Page.

JEFFERSON—CHESHIRE.—On April 17th, at the Parish Church, Neston, Maj. Elgie Blyth Jefferson, R.A.F., son of Mr. and Mrs. Jefferson, of Ballahott, Isle of Man, was married to Muriel, eldest daughter of Mr. and Mrs. Holland Cheshire, of Hallwood, Neston, Cheshire, by the Rev. C. Brooke Gwynne.

MACKIE—MONDAY.—On April 13th, 1918, at St. Stephens' Church, Albert Square, Clapham Road, S.W., Serjt.-Maj. Douglas Mackie, R.A.F., of Hamilton, Scotland, was married to Ethel Lavina, second daughter of Mr. and Mrs. W. H. Monday, of 86, Fentiman Road, Clapham, S.W., by the Rev. R. G. Grundy.

WOOD—AMOS.—The marriage arranged between Capt. Herbert Lee Wood, R.A.F., eldest son of Mr. and Mrs. Lee Wood, of Oakwood, Clifton, Lancs., and Nora Frances, only daughter of the Rev. Andrew Amos, rector of Deptford, and Mrs. Amos, took place at St. Paul's Church, Deptford, on Saturday, April 20th, at 11 a.m.

Births.

DOWLING.—On April 12th, at 22, Bardwell Road, Oxford, the wife of V. Laidley Dowling, R.A.F., of a daughter.

GARRETT.—On April 17th, at Sunnyside, Cradley, near Malvern, to Florry Rose, wife of Lt. Sidney F. Garrett, R.A.F.—a son.

RANGER.—On April 17th, at Kimbolton House, Alleyn Park, West Dulwich, the wife of Lt. C. P. Ranger, R.A.F., of a son.

RYDON.—On April 14th, at Awbrook, near Haywards Heath, the wife of Capt. H. E. Rydon, R.A.F., of a daughter.

FOREIGN COMMUNIQUES.

FRANCE.

April 16th.—Allied aviators carried out several bombardments of the enemy's establishments in the Vardar valley and in the region of Seres.

April 17th.—During the 15th and 16th inst. four German aeroplanes were brought down by our pilots. It is confirmed that two other enemy machines were destroyed on April 12th in an air fight.

April 20th.—During the night of April 18th-19th about four tons of projectiles were dropped by 15 of our aeroplanes on the

Now Ready. **1/6** *net, post free* 1/8.

THE
"Aeroplane" Blue Book 1918
A DIRECTORY OF AIRCRAFT FINANCE
By G. A.
Financial Editor of the "Aeroplane."

THE large and increasing number of Aeroplane Companies make it an urgent necessity to the many interested in the Industry to have, in a concise and handy form, a reliable Work of Reference. "The Aeroplane Blue Book" contains particulars of all the principal public Aeroplane and kindred Companies, giving:—

The Capital of each Company and how divided.
The Amount issued and paid up. Loans and Mortgages.
Names of Directors and other Officials.
Registered Offices. Date of Incorporation.
Profits and Dividends paid and declared.
Date of making up Annual Accounts and when submitted.
Extracts from last Balance Sheet and Directors' Reports.

THE "AEROPLANE" & GENERAL PUBLISHING Co., Ltd.
2, Breams Buildings, London, E.C.4.



PIONEERS

IN AIRCRAFT ENGINEERING

Blackburn AIRCRAFT

and "Always at the Front!"

The Blackburn Aeroplane and Motor Co., Ltd., LEEDS and HULL.

FOR AIRCRAFT WORK.

Small Tools from Stock.

PERSONAL ATTENTION.

Let us assist you by sending us your requirements.

The HIGH SPEED TOOL Manufacturing Co., Ltd.,

SHAFTESBURY ROAD, BOLLO BRIDGE ROAD, ACTON, W.3.

'Phone: CHISWICK 655. Telegrams: HYSPECUT, PHONE, LONDON.

WE HELP TO WIN THE WAR

and Help you with your Contracts.

Manufacturers of **WOOD and METAL Parts and Units** for Aeroplanes. COVERING & DOPING.

The Burton Aircraft & Manufacturing Co., Ltd., PARK STREET, BURTON-ON-TRENT.



landing ground of Champion, and on bivouacs in the region of Ham, Noyon, and Guiscard. During the day of the 19th instant 13 of our machines in the course of two flights dropped 1,850 kilogrammes (over 1½ tons) of explosives on enemy organisations in the region of Roye and Moreuil.

Seventy aeroplanes, during the night of April 19th-20th most successfully bombarded the station of St. Quentin and numerous railway lines in the region of Jussy, as well as the aviation grounds. More than 15 tons of explosives were dropped. Another group of seven machines bombarded the stations of Montcornet, Asfeld, Hirson, and the aerodrome of Clermont-les-Forges. Patrols of aeroplanes flying at a low altitude machine-gunned resting troops.

April 21st, Army of the Orient.—An enemy machine was brought down by British aviators north-east of Petric.

April 22nd.—During the 20th and 21st four German aeroplanes and two captive balloons were destroyed by our pilots, and a fifth aeroplane was brought down by infantry fire. In addition, 16 enemy machines fell in their own lines in a badly damaged condition, after aerial combats.

During the same period our bombarding machines carried out numerous operations. Forty-nine thousand kilogrammes (49 tons) of projectiles were dropped on railway stations, camps, and aerodromes in the region of St. Quentin, Jussy, Chaulnes, Noyes, Ham, Guiscard, and Asfeld.

Two fires broke out in the railway station of Chaulnes, and in the station of Asfeld. An ammunition dump to the east of Guiscard blew up.

It is confirmed that an observation balloon and three new aeroplanes have been brought down, one by means of our anti-aircraft defences.

GERMANY.

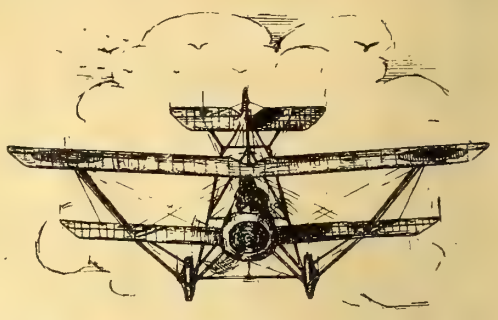
April 21st.—Rittmeister Baron von Richthofen, at the head of the trusty chasing squadron, gained his 79th and 80th and Lt. Buckler his 31st aerial victory.

On the evening of April 13th, a fire broke out at the Friedrichshafen yards, involving also a former Zeppelin hangar. The fire was quickly subdued, and the damage is slight. Work at the yard continues without interruption.

ITALY.

April 18th.—During yesterday five enemy aeroplanes were brought down by our aviators in the region of Valdobbiadene and Conegliano [north of the Montello]; British chasers cruising from the Asiago Plateau to Motta di Livenza [a distance of 60 miles]

Wires:— "Carbon," Cambs. 'Phone:— Cambs. 5.



Special arrangements to assist Enlistment of PILOTS in the

NEW AIR FORCE

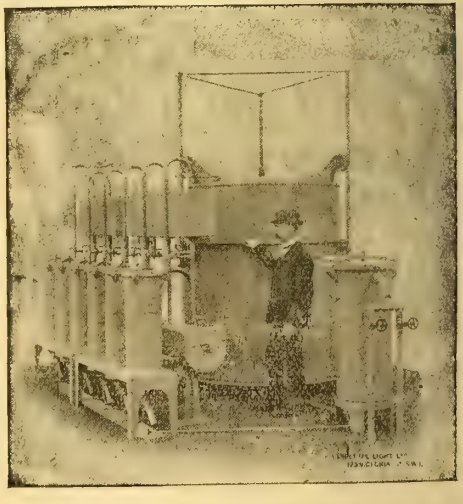
Write for particulars before vacancies are filled to—

The CAMBRIDGE SCHOOL OF FLYING

and AERODROME CO., Ltd.,

30b, St. Andrew's Street, Cambridge.

A REMINDER. The School also conducts:—
in Aero-Engineering; (1) Correspondence Course
for Manufacturers. (2) Drawing Office Service



Class 5 Imperial Acetylene Welding Plant.

OXY-ACETYLENE PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

Telegrams— "Edibrac, Phone, London." Telephone— Victoria 3540 (3 Lines)

AIRCRAFT DEPARTMENT



THE WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

British Metal (Kingston) Ltd.
The Factory,
Kingston-on-Thames

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

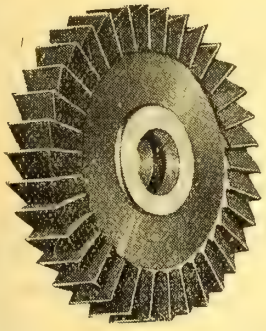
COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, De H.
RESIDENT A.I.D. EXAMINER.

TWIST DRILLS



MILLING CUTTERS

QUICK DELIVERIES.



CENTRE DRILLS.

SEND US



YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,

32, Queen Victoria St., London, E.C.4.

'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.

AEROPLANE PARTS

Do you require Metal Parts for Aeroplane Work? If so, consult us. We can quote for—

Tubes and Tubular Construction Sheet Metal Pressed Parts. Wheel Rims and Special Sections in Steel of any length, gauge or width. Brazing, Acetylene, and Electric Welding, etc.

We can also make any Special Parts to instructions. Consult us NOW.

THE LOMBARD RIM & TUBE CO.,

Lombard Street, BIRMINGHAM.

Bowden Controls AND Cables FOR Aeroplanes

Suitable for all possible purposes. Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD.,

TYSELEY, BIRMINGHAM.

Bowden Tyseley Bowden

R.M.S.

ROK ROOFING

facilitates the speedy erection of Hangars by combination with our famous "Belfast" Girder Principals in

ANY CLEAR SPAN UP TO 100 FEET.

BRITISH & BEST

Write for Booklet "R."

48



D. ANDERSON & SON, Ltd., Lagan Felt Works, Belfast; and Roach Road Works, Old Ford, London, E.

shot down 11 more hostile machines while a twelfth was compelled to land.

A seaplane was hit by anti-aircraft guns, and fell into the sea near Porto di Piave Vecchia; the three aviators who manned it were taken prisoner.

April 19th.—A British anti-aircraft battery shot down an enemy aeroplane in the neighbourhood of Rotzo [two miles east of the Astico and five miles north-north-east of Arsiero].

AUSTRIA.

April 18th.—In Albania Actg. Officer Arrighi achieved his 24th aerial victory.

April 21st.—Capt. Brumowsky gained a victory for the 29th time in aerial battle.

THE WAR IN REVIEW.

Great Britain and Italy.

The "Times" correspondent writes from Rome on April 11th that Signor Orlando, the Prime Minister, in the course of an interview he granted me, referred particularly to "the good feeling that has always existed and at this moment exists with more intensity than ever between Italy and Great Britain."

I should like the British people to know (Signor Orlando continued) that Italy has not been content at this moment with mer expressions of solidarity, however sincere. Our Capronis ar operating on the battle front in France, beside British an French air squadrons, and the formations we have sent to Fran comprise some of our best machines and best fliers.

More Aces.

It is reported by the Paris newspapers that Flt. Sub-Lt. G Meuldre has brought down his twelfth enemy machine, whil Flt. Comdr. Mossenet has just brought down his sixth.

It is reported that Lt. Fonck has brought down his 35 enemy aeroplane.

A Private Opinion.

The special correspondent of the "Morning Post," writir from the French Front on April 19th, says:—

"German aviation," a staff officer said to me, "does n exist. There are two principal reasons for this, the first bei *la casse*—in other words, the tremendous wastage caused in inc sant attacks delivered on enemy aeroplanes by British and Fren pilots. The bombing of aerodromes as the wisest method of rep to the attacks made by the Germans on undefended towns effecting its object, and we are forced to the conclusion that Ge many to-day suffers from lack both of men and machines. V

R. F. & F. W. BROWN

(F. W. BROWN.)

Wollaton Saw Mills
Near Nottingham

ENGLISH ASH FOR AEROPLANES

Bent Timber Manufacturers.

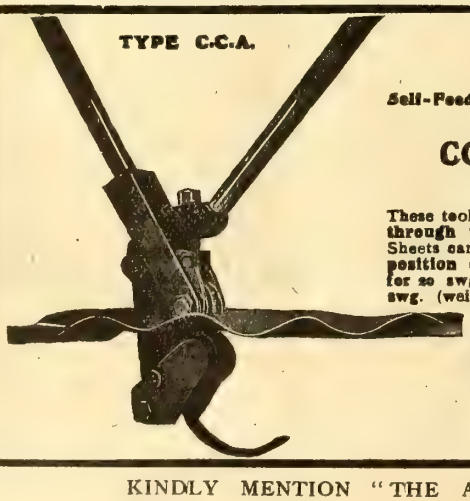
Telephone ... 1526 Nottingham. Telegrams ... Browns, Sawmills, Wollaton.

SHENSTONE & Co., LTD.
AIRCRAFT DEP.
LEYTON.

AIRCRAFT PRODUCTION WITH MODERN METHODS.

E. KEITH DAVIES, General Manager. Telephone: WALTHAMSTOW 24.

TYPE C.C.A.



TANGENT

Self-Feeding HAND TOOLS Non-Distorting
FOR CUTTING
CORRUGATED SHEETS
PATENT.

These tools will cut sheets on any angle, limited curves and through the centre with no distortion of cut edges. Sheets can be cut to required shape when being fixed in position on the job. Made in two styles, as illustrated, for 20 swg. (weight 5 lbs.), with compound leverage for 18 swg. (weight 6½ lbs.). Cuts 100 o/o faster than any other hand method.

Write for Illustrated Pamphlet and Prices.

Montgomery, Smith & Co., Limited,
Patentees and Manufacturers,
Tangent Wks., Keynsham, Somerset, Eng.

TYPE C.C.B.



In small and large stone bottles, and in ¼, ½ and 1 gallon drums.



FIRST IN 1880 FOREMOST EVER SINCE.

PROMPT DELIVERY AGAINST "A" CERTIFICATE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,

NEW CROSS, LONDON, S.E.



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd.

The Linen Hall, Regent Street, London, W.

Gluepots

ELECTRICALLY HEATED.

Have you tried this system?

—if not, you should instal it without delay.

It is the most simple, clean and convenient. No Trouble, no Laying of Pipes, etc., as with Gas Stoves or Fires. NO DANGER from flames. Just a touch of the Regulating Switch and heat is applied and maintained at required High, Medium, or Low Pressures, and instantly cut off.

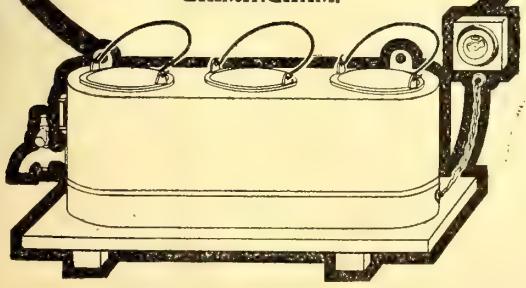
SINGLE, DOUBLE or TRIPLE POTS

supplied. Solid Copper Water Bath, with Water Level Gauge, Cast Iron Pots. Also made to special requirements in any size, and for total immersion work. For all AEROPLANE and MUNITION works we give

PROMPTEST DELIVERY

—also for Dockyards, Railways, Engineers, Pattern Shops. Write us at once.

PREMIER ELECTRIC HEATERS, Ltd.,
258-260, BRADFORD STREET,
BIRMINGHAM.



THE USE OF

NAYLOR'S Aero Varnishes

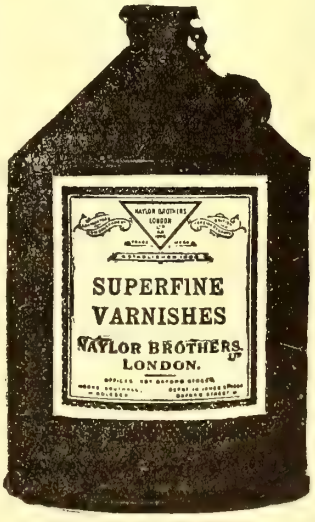
WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.

Some Specialities for Aero Work

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.



NAYLOR BROTHERS (London) Ltd.

Contractors to all Government Departments.

Offices: 407/9, OXFORD ST., LONDON, W. Works: SOUTHALL MIDDX.

know that Germany had taken the desperate step of calling up men from munition works to put into the line. From the way in which she has thrown her divisions into the battle, it is obvious that she believes she is playing her trump card. We have seen that she has been, and still is, exerting her full strength, and if she had aeroplanes available there is no doubt but that she would have made full use of them, as we have done, for observation purposes, to prevent the bringing up of reinforcements, and to disorganise the troops on the actual field of battle. She has done none of these things effectively.

"The conclusion seems manifest that it is because she has not the necessary force available. In any case the fact remains that German aviation has ceased to be a Force to be seriously reckoned with." I am in a position to supplement the remarks of the staff officer by a single statement based on information that at present cannot be disclosed. In the last four weeks the situation, which, on several occasions, has necessarily been delicate, would have been very much more so had the Germans been equipped with an adequate air service to supply them with definite observations.

But Why Agree?

Reuter reports that in the Reichstag on April 16th the Socialist Deputy Herr Gock suggested that an agreement should be reached for the cessation of aerial attacks on open towns outside the war zone.

A member of the Government said that no official request to that effect had yet been received from the enemy Powers. If such a request should be received, it would be examined by the military authorities.

The Crossing of the Sahara.

The "Echo de Paris" says that the crossing by aeroplane of the Sahara, the half of which had already been carried out for the first time, has now been completed by three machines which left Ouargla and arrived at Salah, having completed the trip in seven hours with a solitary landing at Inifel.

The "Petit Parisien" of April 22nd says that Lt. Bernand, a native of Lyons, has carried out a daring raid with a squadron in Southern Algeria, flying 1,300 kilometres (807 miles) to bomb cantonments of hostile Touaregs.

[The second paragraph evidently refers to the same flight as the first, but the correspondent apparently did not know that "raid" is only the French word for "ride," and merely indicates an unusual journey, so apparently he invented the Touaregs to give artistic verisimilitude.—Ed.]

America in the War.

Reuter's correspodent with the American Army in France writes on April 20th:—

Twelve hundred German "shock" troops attacked to-day the American positions west of Remières Forest, north-west of Toul.

Two German aeroplanes were brought down during an engagement, after a futile attempt by them to machine-gun American troops.

Compensation.

Reuter's correspondent at The Hague writes on April 22nd:—

The Foreign Office here announces that the British Government has paid an additional sum of 27,023 guilders, thus settling all the claims on account of the damage done on the night of April 29th, 1917, at Zierikzee by bombs thrown by a British aeroplane.

English Evictions.

The "panic-stricken hordes of aliens who desire to avoid the ambit of enemy air-raiders in London," are to be countered by the Increase of Rent (Amendment) Bill, which was read a second time in the House of Commons on April 17th. It has already passed through the House of Lords.

Under the original Act landlords were allowed to evict tenants of houses below a certain rental if they required the houses for their own occupation. The new Bill provides that from a given date—at present fixed at March 12th—the only landlords who can avail themselves of this exception clause will be those who owned the property at that date, or those to whom the property had devolved by settlement or will.

[After all, English evictions are a pleasing change after centuries of Irish evictions.—Ed.]

An Off Chance.

The "Times" correspondent with British Headquarters writes on April 21st:—

An official *communiqué* has, I think, told you of a curious incident, when British and German machines came into collision in the night and both came down in flames.

[One can trace no reference to this incident in any communiqué.—Ed.]

A Third-Party Accident.

Several villagers were watching an aeroplane which was forced to descend by engine trouble near Bath on April 19th when the machine crashed into them. Mrs. Rhoda Mortimer had her skull fractured and died in Bath Hospital afterwards, and other persons were injured, though not seriously.

BLACK ENAMEL.

AEROPLANE GREY PAINT (flat). Oil and Petrol Resisting.

TRANSPARENT WOOD FILLER.

Subject to A.I.D. Inspection.

HARLAND'S

VARNISHES, ENAMELS AND FINE COLOURS.

By Appointment to His Majesty the King.

MERTON, LONDON S.W.19.

ESTABLISHED 1791.

COPAL VARNISHES for AIRSCREWS and EXPOSED WOOD PARTS, &c.

WHITE DOPE RESISTING PAINT.

Subject to A.I.D. Inspection.

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

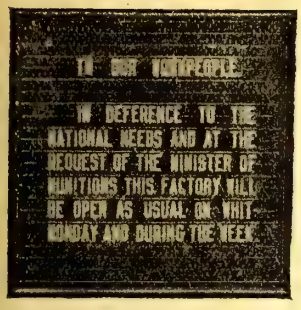
GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street, Hanover Square, W.1.



WHAT HAVE YOU GOT TO SAY TO YOUR PEOPLE?

JUST HANG UP THE LETTERS!

Illustration is Model B, 20 by 16 over all with single piece **metal** panel. Can be had framed in either oxydised c pper finish, polished oak, or mahogany, with an ingen ous **metal** easel or banger, 260 lithographed **metal** letters, two Index hands and a sign shelf in a divided box. The price is **30s.**, delivery in the United Kingdom 5 per cent. extra. Six other sizes in stock, from 9 by 7 to 20 by 36, any size made to order.

As used by His Majesty's Government, British Red Cross, Y.M.C.A., Church Army, Salvation Army, National Kitchens, etc., etc.



Dept. A.

THE
CHANGEABLE SIGN Co., Ltd.
(Incorporating Harris, the Sign King Sign Makers for over 30 years.)

178, 178a, 180a, 165a, 165b.
HIGH ROAD, KILBURN,
LONDON, N.W.6.

'Phone—Hampstead 40.
Telegrams—"Unisines, Kilb, London."
Code—Bentley.

City Showrooms—
36, Camomile St., Bishopsgate, E.C.2

Bowden Wire Ltd.

LONDON
VICTORIA ROAD
WILLESDEN JUNCTION, N.W.10

Victoria Road, Willesden Junction, N.W.10.

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

Light Steel Stampings for Aeroplanes

Any size or weight: Rough or machined: Single Piece or Combination pressed & welded by Oxyacetylene & other processes

Joseph Sankey & Sons Ltd.
Hadley Castle Works
Wellington Shropshire

MOSS-GEARING

AERO-ENGINE GEARING

Manufactured on principles ensuring greatest
STRENGTH AND **ACCURACY.**



GEARING—FLYWHEELS—CAMSHAFTS
R.A.F. PROPELLER BOSSES.

Our Aero parts are made in specially **HIGH TENSILE STEEL**, heat treated and all parts corrected for distortion.

TRANSPORT, LORRY & PLEASURE CAR GEARING

Bevel and Worm Drives accurately generated. Steering Worms and Sectors. Spur and Bevel Differentials. Gear Box Gears. Camshafts with guaranteed Glass-hard Cam Profiles.

-GEARING

THE MOSS GEAR CO., LTD.,
W. DUCKITT Managing Director *Thomas St., Aston, BIRMINGHAM*

PROPELLERS ONLY.

W. D. ODDY & Co
LEEDS.

CONTRACTORS TO H.M. GOVERNMENT

S.B.A.C. The Society of British Aircraft Constructors

Office & Works—
Propeller Works, Balm Road, Hunslet, Leeds.

Telephone—
Central 291.
Telegrams—
Airscrews, Leeds.

Telegraphic Address: Poetry, 'Phone London.
Telephones: Avenue 995, 996, 7996.

(Partners:
H. W. Pritt,
W. G. Pritt,
P. W. Smallwood,
E. R. Hill),

PRITT & CO.

METAL WAREHOUSEMEN, MUNITION AND AERONAUTICAL CONTRACTORS

46, FENCHURCH STREET, LONDON, E.C. 3,

Where all communications must be addressed.

CITY WAREHOUSES: 62a & 64, Vine Street, Minories E.C.
DEPOTS: Paddington, Poplar, Shoreditch.

We hold good stocks, complying with Air Board, R.A.F. and Admiralty Specifications, of the following:

BRASS & COPPER in sheets, tubes, rod, wire, etc.
TINNED STEEL SHEETS.
MILD STEEL SHEETS, 9a.
BRIGHT DRAWN MILD STEEL BARS, 3a.
A. G. S. BOLTS, NUTS AND WASHERS.
COPPER RIVETS. TINMAN'S SOLDER.
SOLDERING IRONS.
BEST SWEDISH WELDING WIRE.
BRAZING SOLDER in wire and granulated Form.
SILVER SOLDER. WIRE GAUZE, &c.

All material passed A.I.D. before despatch.

DAILY DELIVERIES made by our own vans within a radius of 15 miles of our Warehouses.

NOTE.—All orders for Aeronautical Work receive especially prompt attention.

WE ARE BUYERS OF SCRAP BRASS & COPPER.

HIGH-CLASS

ALUMINIUM CASTINGS

FOR ALL TRADES.

We Specialise in Aluminium Cylinders and General Aero and Motor Engine Castings,

CAST IRON CYLINDERS

Water and Air-cooled for Aero & Motor Engines

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,

Atlas Works :: Grove Street,

BIRMINGHAM.

ALUMINIUM AND IRON FOUNDERS.

CONTRACTORS TO H.M GOVERNMENT

W.T.CLARK & CO

Telephone No. Central 2121.

5, GREEN TERRACE, ROSEBERY AVENUE, LONDON, E.C.1.

Telegrams Etalspinner Isling London Two Words

METAL SPINNERS

and

SHEET METAL WORKERS

for Aeroplane Constructors

METAL SPINNINGS for AEROPLANES

Cowlings (complete set)
Coverings
Undershields

Fairings
Petrol Tanks
Shields etc.



BEATEN COWLS OF EVERY DESCRIPTION

SPUN COWLS UP TO 48 INCHES IN DIAMETER



BRIGHT BOLTS & NUTS



(Suitable for Every Description of Engineering Work)

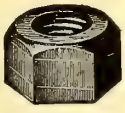
QUALITY, ACCURACY AND FINISH GUARANTEED

THE

"HELICOID" LOCK-NUT

(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ¼in. to 2½in.)  (sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.

WOLVERHAMPTON.

London Offices: 139/141, CANNON ST., E.C.4.

Contractors to H.M. Government.

SWIFT

AVIATION CO.

Dolphin Engine Plates in Stock, Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE— 762 KINGSTON

'GRAMS— "SWIFT, KINGSTON"

THE

BRITISH WRIGHT

CO. LTD.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

Manufacturers of

AERONAUTICAL INSTRUMENTS

FOR

NAVY & ARMY AEROPLANES

Ogilvie Air Speed Indicators

For use on Aeroplanes, Airships, Kite Balloons and Air Stations.

Statoscopes.

Recording Manometers.

Wind Speed Recorders.

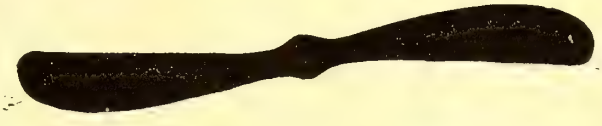
At present the Government is taking the entire output, but British and Foreign Firms are invited to place their orders now for delivery of Aeronautical Instruments after the war.

The BRITISH WRIGHT Co. Ltd.

33, CHANCERY LANE, LONDON, W.C.2.

CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.

Edgware Road, The Hyde, Hendon, N.W.9.

Telegrams: "Aviprop, Hyde, London." Telephone Kingsbury 104.

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE AIR SERVICES.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

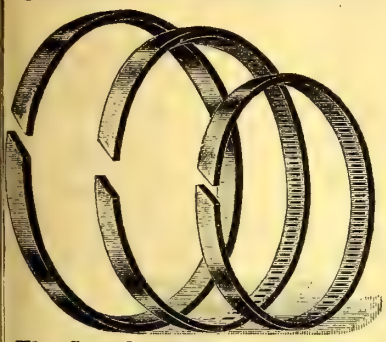
"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G.
COMPANY, LIMITED.
Telegrams: *Cellutate, London.*
8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4045.*
Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)

A.G.S. WASHERS
Turn Buttons.
Eyelets.
Washers.
Wire Work.
THIMBLES
UNION NUTS & NIPPLES.
W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET, BIRMINGHAM.
Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

THE SIBERIAN & GENERAL TRADING CO., LTD.
Can supply from stock or for prompt shipment
PLYWOOD
IN ALL WOODS, SIZES AND THICKNESSES.
SPECIALITY: BOARDS FOR AIRCRAFT WORK.
HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).

In our Special Piston Ring Iron. All sizes up to 72 in.

Quick Delivery.

Absolutely Reliable.

Low Prices.

Telephone No. 2149.
Telegrams—
"Ocean," Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Premier Works, Don Road Sheffield.

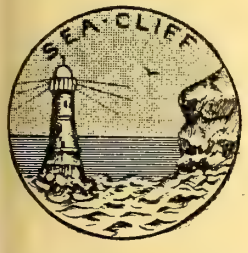
EYE BOLTS.



The CARLETON MFG. Co., Ltd.
Brighton Square,
573b, Moseley Road, Birmingham.

Manufacturers of

PHOSPHOR BRONZE,
GUN METAL,
MANGANESE BRONZE,
BRASS & COPPER,
TUBES, SHEETS, RODS, WIRE, AND
CASTINGS.
PHOSPHOR TIN,
PHOSPHOR COPPER.



CHARLES CLIFFORD & SON, LTD.,
BIRMINGHAM.

SIXTH EDITION, 1918.

DYKE'S AUTO-ENCYCLOPEDIA.

THE STANDARD WORK ON MOTOR MECHANISM

Sanction has been given for this Book to be supplied through H.M. Stationery Office to Schools of Military Aeronautics.
Adopted by the American Government (War Dept.) for use in all their Aviation Schools.

A Thorough, Practical & Simple Treatise on Principle, Construction, Repairs and Troubles—and How to Remedy Them.

THE BOOK for the EXPERT and the STUDENT.

Containing upwards of 900 pages. 775 Illustrations on Electrical Subjects. 1,189 Illustrations on Repairs and Adjustments. 300 Illustrations on "The Ford." 5 Coloured Inserts.

OVER 250,000 COPIES SOLD.

Price **£1 : 1 : 0** net, post free, cash with order, from your Bookseller, or direct from the Publisher,

S. G. GILLAM, Dome Building, RICHMOND, SURREY.

Prospectus on Application.

Aluminium Castings

Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

Contractors to H.M. Government

Chill Castings for Aeroplanes a Speciality.

Telephones: 3846 City. 4879 Central
Telegrams: Krankases, Isling London

R. W. COAN
The Aluminium Foundry
219, COSWELL ROAD,
LONDON, E.C.

SALMSON AERO-ENGINES

(Canton-Unné System).

All enquiries should be addressed to

THE DUDBRIDGE IRON WORKS, Ltd.
STROUD,
GLOUCESTERSHIRE.

London Office:
87, *Victoria Street, S.W.*1,

'CROID'

REGISTERED TRADE MARK

LIQUID GLUE

Adopted by H.M. Admiralty, Air Ministry, etc., for Aircraft Construction.

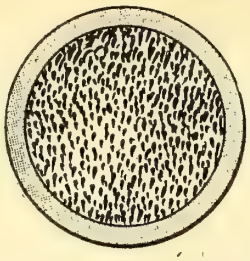
Sole Manufacturers:
THE IMPROVED LIQUID GLUES CO., Ltd.
Gt. Hermitage St., and Bushell St., London, E.1.

Telephone: Avenue 3178.
Telegrams: Excroiden, Wapp, London.

Contractors to H.M. Government Departments.



ANTOL CASE HARD



Harden your Screws and Gauges with **ANTOL.**
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1.

THE POOLE AVIATION CO.
POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines.

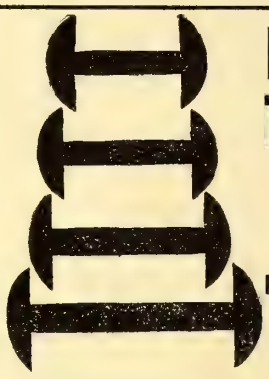
ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

CHAS. P. KINNELL & Co. Ltd.,
SOUTHWARK ST., LONDON, S.E.1.

SPECIALISTS IN

HEATING
HOT WATER SUPPLY AND
VENTILATION
OF AERODROMES, FACTORIES, OFFICES, &c.
EXPERT ADVICE AND ESTIMATES FREE.



DON'T HAVE TROUBLE
specify
SMITH & DAVIS MAKE
of
GREEN'S
Pattern
BELT FASTENERS.
From all Mill Furnishers and Ironmongers.

Wholesale only from Makers

SMITH AND DAVIS, LIMITED.
STAMPERS & PIERCERS, Hampton Street, BIRMINGHAM.



ANY SIZE. ANY TAPER. SPLIT OR SOLID.
FREDk. MOUNTFORD, Ltd.,
FREMO WORKS, LIFFORD, BIRMINGHAM.

Aeroplane Steel Sheets
as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.
IRON AND STEEL WAREHOUSE
SMETHWICK, BIRMINGHAM

Telegraphic Address: "Bernico," Birmingham. **Telephone No.:** 224 Smethwick.

The Air Navigation Co., Ltd.

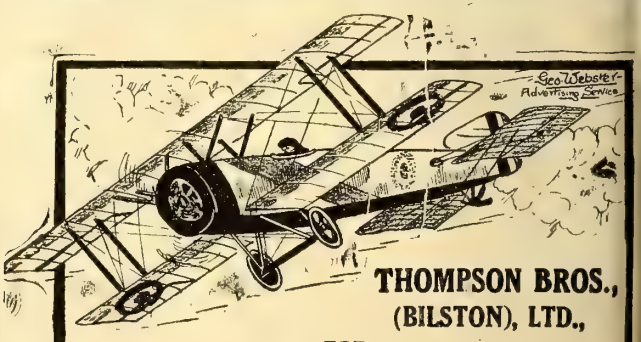
BLERIOT & SPAD AIRCRAFT WORKS,
ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director.

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.



THOMPSON BROS., (BILSTON), LTD.,
— FOR —
UNDERCARRIAGES
TUBULAR FRAMEWORK
AERO. DEPT. BILSTON, Staffs.

THE
"BOWSER" AEROPLANE SEATS
(Made to A.G.S. Drawing 264).
Supplied to the Royal Aircraft Factory and the Leading Aircraft Manufacturers.
Manufactured by EDWARD BOWSER, 50, Park Lane, Leeds. Tel. No.: Central 3473.
Under the A.I.D. Inspection.
Northern Representative—
Mr. WALTER M. DANIELL,
33, East Beach, Lytham.

RUBBER PETROL RESISTING
HOSE, TUBING & CONNECTIONS
WASHERS, RINGS, BUFFERS, SHEET. STRIP, MATTING, MOULDINGS.
PHONE CITY 3811 3812
JAMES LYNE HANCOCK, Ltd., 266, Goswell Rd., London, E.C.1

HIDE GLUES FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.
— APPROVED —
Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.
Telephone: 4978 Avenue

Telephone—Works: East 3832, 3833 Offices: 3474 Gerrard. Telegraphic Address—"Extouboul, London."
THE STANDARD Aircraft Manufacturing Co., Ltd.
CONTRACTORS TO H.M. ADMIRALTY AND AIR BOARD.
Head Office: SAVOY HOUSE, Corner of Savoy Street, STRAND. W.C.2.
Works: 28, BOW COMMON LANE, LONDON. E.3.

EBORA PROPELLER Company 11 & 12 Surbiton Park Terrace KINGSTON on Thames Telephone KINGSTON 672 Telegrams EBORA, KINGSTON
Ebora Propellers
Contractors to the Admiralty and War Office
SCHOOL PROPELLERS
FOUR BLADERS
SEAPLANE PROPELLERS
SLATE TABLES For PROPELLER WORKS

Lang Propeller LTD.
Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.

CRADOCK'S STRANDS & CABLES
Manufactured from Tinned Steel Wire of the Highest Quality.
CONTRACTORS TO HIS MAJESTY'S GOVERNMENT.
GEO. CRADOCK & CO., Ltd., Head Office and Works: WAKEFIELD. London Office: 7, East India Avenue.

Auster (1914) LTD
for AUSTER-TRIPLEX SHIELDS
AERONAUTICAL ACCESSORIES
LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."
BIRMINGHAM:
Crown Works, Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 5912. E. H. Godbold, Director
GODBOLDS

Phone: Putney 737. Established 1912.
ROPOR'S
Aeroplane and General Sheet Metal Works.
COWLS, TANKS, UNDERSHIELDS, FAIRINGS.
Hammered Work in all Metals.
Experimental and Special Work Undertaken.
347a, New Kings Road, Fulham, London, S.W.6.

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

Clegg Metal Engraving Co.
Chatsworth Works, Worthing,
For Dials, Scales, Name-plates and Address Plates, and Instruction Plates, in Metal, Ivorine, Etc.
Either Chemically Engraved or Machined.

ALWIN ENGINEERING CO., AERONAUTICAL ENGINEERS.
A. E. CARTLIDGE. LUTHER ROAD, TEDDINGTON, S.W.
Tel. No. Kingston 2412.
TRADE MARK ALWIN
Makers of all kinds of Aircraft Fittings.
Presswork a Speciality,
Pressings for DeH, etc.
Avro, Sopwith, Fairey and many other types.
On receipt of Post Card our Representative will call and give immediate quotation.

Springs! Springs! Springs!
We make a speciality of
Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

SYSTEMS at RACING & ROULETTE
A book of absorbing interest to all System lovers, showing how a regular and substantial income can be earned with small capital.
Price—THREE PENNY STAMPS.
SIMPLEX PUBLISHING, 1, NEW OXFORD STREET, LONDON, W.C.1

Clean Coloured Rags
FOR CLEANING & WIPING.
Best and Cheapest for Munition Works :: Engineers, Printers & Bus Companies, etc.
A. JOSEPH, EARL STREET, LONDON ROAD, LONDON, S.E. 1.
Telephones: Hop 83, 361 & 4272. "Cheaper than cotton waste."

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work. Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices & Works: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

CIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS, In these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions, Contracts, etc., 1/6 per line For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1

PATENTS.

E & ROWLINSON, Chartered Patent ts (Consulting Engineer, Mr. S. E. , A.M.Inst.C.E.), 27, Chancery Lane, on, W.C. Tel. 332 Central.

y Skerrett, Chartered Patent Agent, 24, ole Row, Birmingham.—Patents, trade s, and designs.

tors advised free. Write for booklet.— 's Patent Agency, Ltd., 165, Queen ria Street, London. 30 years' references.

ey, Popplewell and Co., Patent Agents Consulting Engineers. Applications for ts attended to in all countries.—38, cery Lane, W.C. Telephone: 1763 Cen- Circular free.

SITUATIONS VACANT.

rge Firm, London, N.W., has several cies for aeroplane erectors and assem- used to accurate and high-class aero- work. No one living more than 10 away or engaged on Government work write to Box 3360, THE AEROPLANE, 166, lilly, W.1.

ghtsmen and Assistant Draughtsmen re- l on aeroplane work; good mechanical ence essential. No one on Government need apply.—Applications must be made gh your nearest Employment Exchange, oning this paper and No. 3457.

ghtsmen and Tracers (Ladies) wanted diately for aircraft work. No one on nment work will be engaged.—Apply, ; experience to May, Harden & May, Hythe, Hants.

d as Foreman, first class Fitter and , experienced in Aircraft Metal Work, rsmith and Acetylene Welding; good ser and strict disciplinarian. No one on ment work will be engaged. State experience, and salary required to your t Employment Exchange, mentioning per and No. 3506.

nd Invoice Clerks required, male and , for aeroplane Factory, London t. Preferably with aeroplane or ering costing experience. No person t more than 10 miles away or already overnment work need apply.—Reply, age, particulars of qualifications, and required, to Box No. 3501, THE ANE, 166, Piccadilly, W.1.

Mechanics wanted immediately for a new aircraft factory on the South Coast. be first class men, thoroughly used to uling tuning, testing and fitting into nes 100 h.-p. Mono Gnomes. No one on ment work will be engaged.—Give particulars of qualifications and salary d to your nearest Employment nge, mentioning this paper and 39.

ine Factory Progress Department.—En- required, capable of taking charge of s department of large aeroplane manu- works (London). He must have had a gh engineering works training, be well ated with modern methods of production, very systematic in his books. He will ctly responsible to the superintendent of tory, and have entire control of the pro- staff in the various departments. A good will be paid to a capable man. Apply, age and salary required, and giving rticulars of past experience, positions nd when free to commence. No one pply who is living more than 10 miles or engaged on Government work.— Box No. 3487, THE AEROPLANE, 166, adly, W.1.

liering Agency.—Wanted an energetic or London and district to sell aeroplane parts. Good commission.—Box No. THE AEROPLANE, 166, Piccadilly, W.1.

Fitter Erectors (final erection) and engine fitter-erectors required for De H. 9 machines. No one residing more than 10 miles away or engaged on Government work need apply.—Ruffy, Arnell, and Baumann Aviation Co., Ltd., Noel Road, Acton, W.3.

Skilled Turners required for large Midland factory. Men used to aeroplane engine work need only apply. No persons already engaged on Government work will be accepted. State age, experience, and salary required. Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3536.

Wanted Capable Engineer, must be able to take charge of a job under works manager's direction. Practical man essential. No person engaged on Government work or resident more than 10 miles away will be engaged.—Palmer's Garage, Tooting, S.W.

First-class Draughtsman wanted for post near London as checker of jig and tool work. Must be experienced and reliable. No person already on Government work will be engaged.—Apply your nearest Employment Exchange, mentioning this paper and No. A5096.

RADIATOR AND SHEET METAL WORK

UNION WORKMEN

(BEST RATES PAID)

WANTED

No one already on Government work, or resident more than ten miles away will be engaged.

Apply—

GALLAY RADIATOR CO., LTD.

198, Gt. Portland Street, W.3

Draughtsman wanted by large firm of aeronautical engineers in the North-West London district; previous experience in aircraft work not essential; good mechanical knowledge required. No one already on Government work or living more than 10 miles away will be engaged.—Apply, stating age, experience, and salary required, to Box P., c/o W. H. Smith and Son, 54, Fetter Lane, E.C.4.

Progress Clerks wanted at once, aircraft factory, London area. Accustomed to modern progress methods. Must have good initiative, energy, and resourcefulness. Those engaged on Government work need not apply.—Write, stating age, salary required, etc., to Box 7871, c/o Willings, 33, Knightsbridge, S.W.1.

Draughtsman required for aircraft factory, London district. Alterations, quantities, supervising technical details, etc. No one engaged on Government work or resident more than 10 miles distant need apply.—Write, stating experience, salary required, etc., to Box 8771, c/o Willings, 33, Knightsbridge, S.W.1.

Experienced Tool Designers required. Used to jigs and tools for aero engines and small calibre guns, press tools for aeroplane parts or automatic machine tool lay-outs. Persons already engaged on Government work should not apply.—Apply your nearest Employment Exchange, quoting A5069.

Wanted Competent Charge Hand, used to all kinds of spares for Government and proprietary types. Capable at jigs and inspection. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3520, THE AEROPLANE, 166, Piccadilly, W.1.

General Woodworking Foreman wanted at once for factory engaged on spares in North of England, accustomed to detailed construction of complete machines, thorough knowledge of woodworking machinery. Good production essential. No one engaged on Government work or resident more than 10 miles away need apply.—Send full particulars of experience, wages required, etc., to Box No. 1778, c/o Willings, 33, Knightsbridge, S.W.1.

Wanted Foreman, experienced in aircraft metal work and machine tools in small modern factory in the S.W. district. Good disciplinarian and output producer. Salary and bonus. State experience, references, and salary required. No one on Government work or residing more than 10 miles away need apply.—Box No. 3526, THE AEROPLANE, 166, Piccadilly, W.1.

Agents wanted by manufacturers of sheet metal fittings. One for each of the principal centres of the aircraft industry. Good connection essential.—Box No. 3523, THE AEROPLANE, 166, Piccadilly, W.1.

Required, Good Man, for planning department in aeroplane factory, London district, capable of laying out machine operations. No person resident more than 10 miles away or already on Government work need apply.—Reply, stating age, full particulars of experience, and salary required, to Box No. 3522, THE AEROPLANE, 166, Piccadilly, W.1.

Works Organising Manager wanted for large aeroplane works, London; must be practical, with knowledge of up-to-date methods of production; good salary and prospects for first-class man with energy and ability. No one living more than 10 miles away or already engaged on Government work need apply.—Write, stating age, qualifications, and salary required, to Box No. 3521, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Foreman of Aircraft Woodwork and Assembly desires engagement. Good organiser and disciplinarian. Modern methods with tactful control of labour.—Box No. 3516, THE AEROPLANE, 166, Piccadilly, W.1.

Foreman, practical experience in jig, rib, wings, and flap making; would suit firm starting.—Box No. 3532, THE AEROPLANE, 166, Piccadilly, W.1.

Buyer, aeronautical experience in large factory, seeks similar position; well up in all branches.—Box No. 3540, THE AEROPLANE, 166, Piccadilly, W.1.

Engineer requires responsible position; 24 years' practical and technical engineering experience. Would take charge of aeroplane erections or fitting shop.—Box No. 3537, THE AEROPLANE, 166, Piccadilly, W.1.

Works Manager disengaged. Good practical engineer, thorough knowledge of aeroplane and seaplane construction on modern lines, very progressive, good organiser and tactful controller of labour. First-class testimonials.—Apply, Box No. 3538, THE AEROPLANE, 166, Piccadilly, W.1.

Purchaser, with over 17 years' aeronautical and automobile sound commercial experience (British and continental), seeks appointment with enterprising and progressive firm. Extensive knowledge of all markets, building materials, engineers' tools, timber, fabric, etc. Keen organiser. State definitely salary and prospects. Free now.—Box No. 3530, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED —Continued.

Head Cost Clerk desires position, thoroughly experienced in aeroplane and engineering costing, wages, stock records, and general office routine.—Box No. 3524, The Aeroplane, 166, Piccadilly, W.1.

Buyer, Engineers' (Grade 3), thoroughly conversant with trade requirements. Good organiser and in touch with keenest markets; is desirous of making a change.—Full particulars on application to Box No. 3527, The Aeroplane, 166, Piccadilly, W.1.

Works Manager for London engineering aircraft works (metal fittings, sheet metal work on direct Government contracts), capable of taking entire charge of works; experienced; reliable. State terms, references.—Box No. 3531, The Aeroplane, 166, Piccadilly, W.1.

R.F.C. Flying Officer desires position as pilot or superintendent with aviation company, having had extensive experience both in construction and testing of many types of machines, both land and water, home and abroad. —Box No. 3533, The Aeroplane, 166, Piccadilly, W.1.

Gentleman, thoroughly acquainted with design and production of latest types of aircraft, desires position of administrative or representative character.—Box No. 3534, The Aeroplane, 166, Piccadilly, W.1.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road Manchester.

AVIATION.

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Engineer in Aeronautics. Demonstrations from complete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTITUTE LTD.

21a, Loudoun Road, St. John's Wood, N.W.8.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1

Engineering Firm with well-equipped machine shops, now engaged on munitions, solicits inquiries for all classes of turning, drilling, grinding, milling, fitting, etc. Aircraft fittings, also copper pipe work, a speciality. Correspondence with a view to post-war business especially invited.—The Lankester Engineering Co., 39, Eden Street, Kingston-on-Thames.

Rubber Twill Cuttings, in any quantity. State average size, quantity and price required, to Aylen, 38, Sun Street, London, E.C.2.

A London Firm in South-Western district has facilities for doping and covering, in addition to woodwork of all descriptions, with a large output and guaranteed deliveries. Estimate on application.—For further particulars, apply Box No. 3535, The Aeroplane, 166, Piccadilly, W.1.

Wanted copies of The Aeroplane—whole of Vol. I.; also numbers of Vol. I. for Oct. 19th, 1911; of Vol. II., Feb. 8th, 1912; of Vol. III. for July 11th, 1912; of Vol. IV. for Jan. 23rd, Feb. 6th, and March 27th, 1913, and of Vol. XI. for Sept. 6th, 1916. Any of these numbers will be of service.—Write, stating price, to X. Y. Z., Aeroplane, 2, Bream's Buildings, E.C.

Woodworking Firm (just finishing contract for flying boat parts) is prepared to undertake machining or assembling of any class of aircraft work, large works. Fully equipped with latest machinery; accurate work and prompt delivery guaranteed.—Apply, Box No. 3529, The Aeroplane, 166, Piccadilly, W.1.

Best Process. Aluminium Repairs. No distortion. Cylinder welding and reboring. New pistons (certificates only). — Address, Aluminium Repair Co., 60, Hardman Street, Manchester. Tel., 4087 City.

Work wanted for six high-speed sewing machines on power. Efficient workers, used to good work. Must be war work.—Write, Manageress, 17, Church Road, Barnes, S.W.13.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page II. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264 or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester.

We undertake Contracts for light engineering work. Ask for quotation.—R. L. Dubois & Co., Aeronautical Engineers and Manufacturers, 673, Romford Road, Manor Park, E.12.

Cane Seats. Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

FOR SALE.

Tarpaulins.—Waterproof khaki sheets for sale; also few second-hand railway truck tarpaulins; London works.—For prices and particulars write Johnston, 12, Broughton Road, **Inventor** wishes to dispose of patent of improved Inclinometer for Aircraft.—Address inquiries to Box No. 3494, The Aeroplane, 166, Piccadilly, W.1.

For Sale, 30 h.p. lorry chassis, in first-class condition; immediate delivery; any class of body fitted to suit customer.—The Royal Garage, 48a, Gillingham Street, Eccleston Square, London, S.W.1.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid. —Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 9 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

TO LET.

Convenient Workshop to let, situated West End of London. Two floors, to accommodate 30-35. Fitted electric light, power, and gas. Good benches.—Apply, Box No. 3525, The Aeroplane, 166, Piccadilly, W.1.

MISCELLANEOUS.

MAKE MONEY BY WRITIN(

£50 PRIZE. Send postage (2d.) fo ticulars and copy of "How to Earn while Learning How to write for News and Magazines." Practical and C hensive Correspondence Courses—Ficti Articles, etc. Expert Literary Dir Constructive Criticism. Beginners how to make work saleable. Exce testimonials. Address "Editorial" E.M.), 22, Chancery Lane, London, W

Luminous paint for wrist watches, match boxes, etc.; remains lumino years. Bottles 1/9 and 2/9.—Tobin 39, Charles Street, Hatton Garden, E.(

DOPE ROOM & WORKS HE ARRANGEMENT DESIGNED EXECUTED.

in quickest possible time by H. Pl M.I.H.V.E., Heating Engineer, Brook Ironworks, Scarborough. Establishe

MODELS.

T. W. K. Clarke and Co., Ltd., Mo partment, Hampton Wick.—Though full up with full-size aeroplane pa we still build models as we did in 190 with Biplanes, etc., in Stock.—Send 3 for our illustrated List, 120 items models; certain metal goods are out o

Model Motors.—First-class ½-h.p. Mot or water-cooled, castings, with cylind valves bored, crank-cases spigotted, plug tapped, valve box machined out; tive. See list price, 2d. Catalogue—C Petrol Motors — 2d. — Littleover Derby.

PUBLICATIONS.

BOOKS

By Lieut. Victor W. Page of the U.S. Air

JUST PUBLISHED.

AVIATION ENGINES. Their Design, tion, Operation, and Repair. A book for th Engineer, and all interested in Aviation. by ised authority. Giving practical instructio and maintenance not to be found e Medium 8vo. 580 pages, with over 240 tinctive and specially made Engravings Price

GLOSSARY OF AVIATION TER English-French and French-English. C 100 pages, with Plates and Illustration Price

AN AVIATION CHART. A large W showing a typical Aeroplane Power Pla Section, with all important component Folding to Pocket Size. Price Ne

London: CROSBY LOCKWOOD 7 Stationers' Hall Court, E.C

Just published. 360 *pp. with Illustrations,* 6¾ *in., limp cloth. Price* 6/- *net (postage,*

The Aviation Pocket Book for

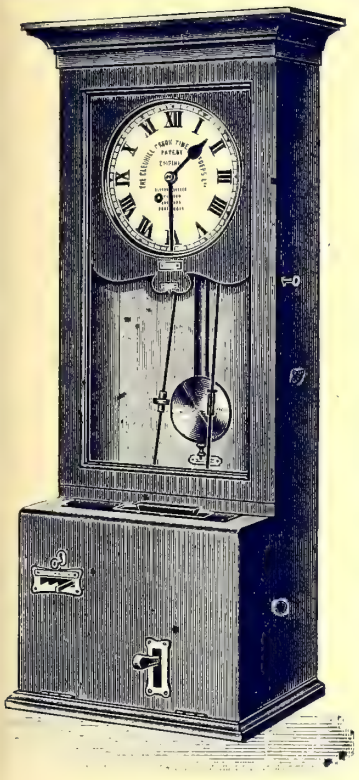
By R. BORLASE MATTHEWS, Assoc. M. Inst. C.E., F.Ae.S.

Containing data on Aeroplane Theory and Air Pressure and Resistance, Structural M Engines, Typical Aeroplanes, Piloting, Meteorological Data, Scouting and Signalli etc. With Glossary and other information to all interested in Aviation.

Prospectus on Application.

London: CROSBY LOCKWOOD & 7, Stationers' Hall Court, E.C.





The Recorder which stamps the definite minute—

IN MANUFACTURE every effort is made to produce a reliable strong machine.

Only best materials are used and the Recorders are British throughout.

WE ARE SUPPLYING H.M. Government and Government Controlled Factories, also many Aeroplane Works.

"CONCERNING COSTS" FREE.

"PRACTICAL COSTING." By A. H. Gledhill, A.M.I.M.E. 3/- Post Free.

COMBINED TIME AND JOB CARD

for recording complete labour cost.

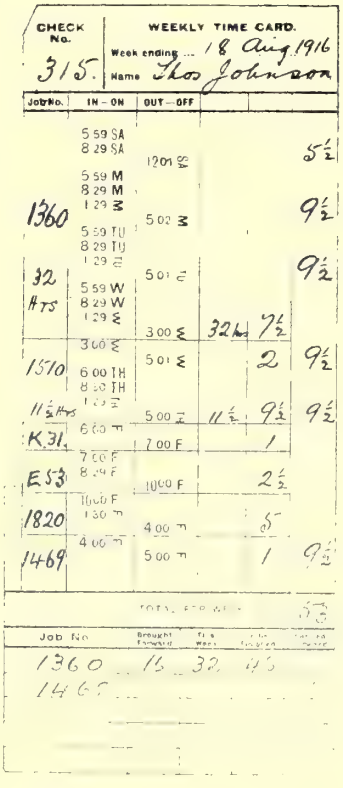
The "**IN**" and "**OUT**" time is recorded on the card, also the time when jobs are changed.

The TIME on the Job is cast out at the side of card and the total hours entered in the Job No. column under the Job number.

Unfinished Jobs are entered at the foot with Job number and the total hours worked up to the week-end under column headed "Carried Forward," and transferred to the next week's time card in the column "Brought Forward," any time worked on this job during the second week is entered in the column, "Time for this Week." If the job is completed during the second week, the total is added and entered in the "Jobs Finished" column. If the job is not completed, the total is entered in the column "Carried Forward," which will in turn be entered on the third week's time card.

STANDING ORDER NUMBERS for constantly re-curring Non-Productive Jobs are represented on the card, e.g. K.31 Grinding Tools; E.53 Making a New Lathe Tool.

SYSTEM B.



THE GLEDHILL-BROOK TIME RECORDERS LIMITED.

26, VICTORIA STREET, LONDON, S.W.1. Tel. Vict. 1310.

EMPIRE WORKS, HUDDERSFIELD. Tel. 1069.

44, HILL STREET, BIRMINGHAM. Tel. Midland 2086.

WYCOMBE AIRCRAFT CONSTRUCTORS, Limited.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

CONTRACTORS TO THE ADMIRALTY AND AIR COUNCIL.

SHORT BROTHERS,

Aeroplane and Seaplane Works,

ROCHESTER, KENT,

AND

Aircraft Works & Flying Grounds,

BEDFORD.

Telephones:—
627 Chatham
261 and 262 Bedford
788 Battersea.

S.B. A.C. The Society of British Aircraft Constructors

Telegraphic Addresses:
"Seaplanes," Rochester.
"Shorts," Bedford.
"Ballooning," London.

London Office: WHITEHALL HOUSE, 29/30, CHARING CROSS, S.W. 1.
Telephone: [illegible]
Telegrams: "Tested, Phone, London."

THE AEROPLANE

Edited by C. Gray

WEDNESDAY, MAY 1, 1918.

Vol. XIV. No. 18. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

THE NORMAN THOMPSON FLIGHT CO. Ltd.

ESTABLISHED 1909

Telegrams—SOARING, BOGNOR
ENTIFLYTE CHARLES, LONDON

Works—MIDDLETON, BOGNOR

CONTRACTORS TO THE ADMIRALTY

Telephones—BOGNOR 48. GERRARD 7385

London Office—
DEWAR HOUSE, 11, HAYMARKET, S.W.1.

DESIGNERS AND MANUFACTURERS OF FLYING BOATS AND LAND PLANES

Auster LONDON. FOR **Aero-shields** BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE
NON-POISONOUS
DOPE
SEE ADVERT. INSIDE.

TELEPHONE: OLDBURY 111. **ACCLES & POLLOCK, LIMITED.** TELEGRAMS:- ACCLES OLDBURY

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.
SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.

TRIPLEX SAFETY GLASS

The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

THE
Engineering Timber Co., LTD.

Beg to advise their Northern customers that they have now established a Branch

AT

CUNARD BUILDINGS, LIVERPOOL.

Telephone: BANK 3944. Telegrams: ENTIKOSIL, LIVERPOOL.

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK.

SAFES.

COOKE'S (FINSBURY) LTD.

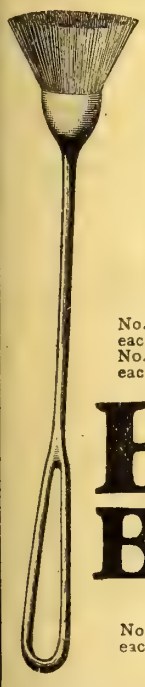
FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

Telephones { LONDON WALL { 6179 573

See Telephone Book relating to our Shopfitting, Signs and other Departments

'DUCO' CLEANING BRUSHES.

For cleaning down engines, etc. The method of construction precludes the falling out of bristles through the action of petrol, water or wear. The looped handle is comfortable to hold and affords a firm grip.

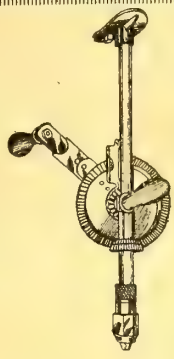




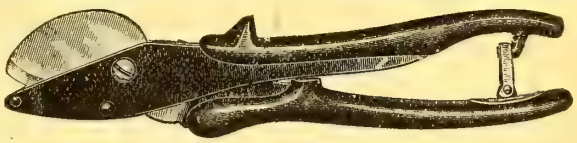
No. B28/37 Small, each 1/3
No. B28/38 Medium each 1/6
No. B28/39 Large, each 1/9

THE HOUSE for TOOLS

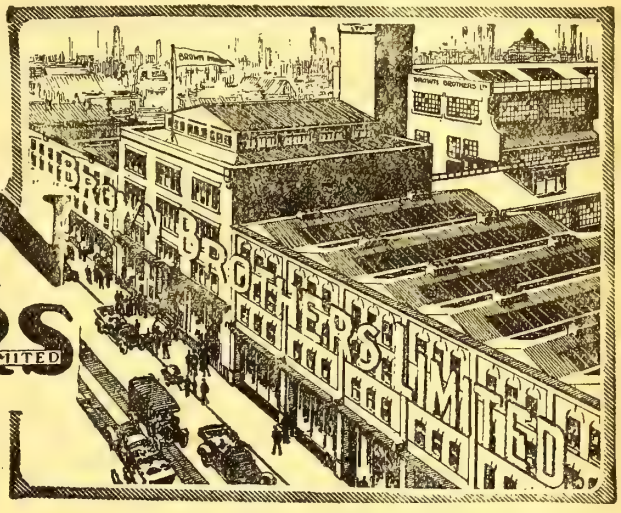
Aircraft Manufacturers requiring small tools of all kinds are advised to write or 'phone us, stating their requirements.



Phone 6300 London Wall. Extension 39.



Fabric Shears made of stamped steel with specially hardened cutting blade for cutting brake linings, etc. This tool will save a lot of time and labour.
No. 8520 .. **10/6**



BROWN BROTHERS LIMITED

Head Offices and Warehouses: GT. EASTERN STREET, LONDON, E.C. 2.
Depots at Manchester & Paris.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

GOVERNMENT CONTROLLED ESTABLISHMENT.
UNDER THE MUNITIONS OF WAR ACT.

ADAM, GRIMALDI & Co., LTD.

AIRCRAFT MANUFACTURERS
CONTRACTORS TO H.M. GOVERNMENT

ALBERT WORKS, GLASSHOUSE STREET,
ALBERT EMBANKMENT, VAUXHALL, S.E. 11

Telegrams: "Autocoach, 'Phone, London." Telephone: Hop 5552 (3 lines)

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co Ltd

CONTRACTORS TO H.M. GOVERNMENT.

Designers and Manufacturers of all Types
of Aircraft for Overland and Oversea
Purposes, Flying Boats, etc.

Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

Aviation Works & Offices - 229-231, Hammersmith Road, W.
Engineering Works - - King Street, Hammersmith.
Airscrew Works - - Ravenscourt Park, W.



FOR over a hundred years the mark of Boulton & Paul on any article has meant that it represented the highest utility at an honest price. Now that the making of Aircraft is added to our other activities we intend by every means possible to maintain the reputation of that mark.

Founded 1797

BOULTON & PAUL LTD.
Makers of Aircraft
NORWICH.
Telegrams: AVIATION, NORWICH.
Telephone: 851 NORWICH, 5lines)


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY

Sterling

CASTINGS

"STERLING" Castings are made from metals scientifically prepared for the work for which they are intended. Each day's cast is carefully analysed and any deviation corrected. "Sterling" methods of moulding, coring up, and of gauging moulds and finished castings ensure a high average of accuracy.

Aluminium Crank Cases, Cylinders, Pistons;
Iron Cylinders, Pistons, Cylinder Liners;
Bronze, Phosphor, 42 Ton Manganese.

Sterling Metals, Ltd:
Coventry.
WIRE: "STERMET" COVENTRY
PHONE: COVENTRY 881

The Hollow Structure and Aircraft Co., Ltd., Patents applied for.

WOOD PROBLEM SOLVED.

HOLLOW SPARS

And Struts for all types of machines.

Any length, shape or section without joints.

FULL PARTICULARS FROM THE SOLE LICENSEES,

ROBERT YOUNG'S CONSTRUCTION CO., LTD.,

AIRCRAFT CONTRACTORS,

CANONBURY WORKS, ESSEX ROAD, LONDON, N.

TELEPHONE—
DALSTON 2985.

TELEGRAMS—
BYLDINCONT NORDO LONDON."

TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE-ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.

A PERFECT FINISH

is assured if you use Naylor's Superfine Products.

Write for Booklet describing Specialities for AERO WORK.

Our qualities include :

AIRSCREW VARNISHES

(Particulars of scheme approved by A.I.D., free on request.)

Dope-resisting White Paints and Varnishes,

Seaplane Varnishes, Etc., Etc.

And a variety of other approved Finishes.

Samples sent with pleasure.



NAYLOR BROTHERS
(LONDON) LTD.
Manufacturers of Superfine Varnishes,
Paints, Enamels and Distempers,
LONDON & SOUTHALL.
Offices : 407 & 409, OXFORD ST., London, W.
Depot : 14, JAMES STREET, Oxford St., W.

TELEPHONE—926 PAD.

Established 117 Years.

Contractors to all Government Departments.



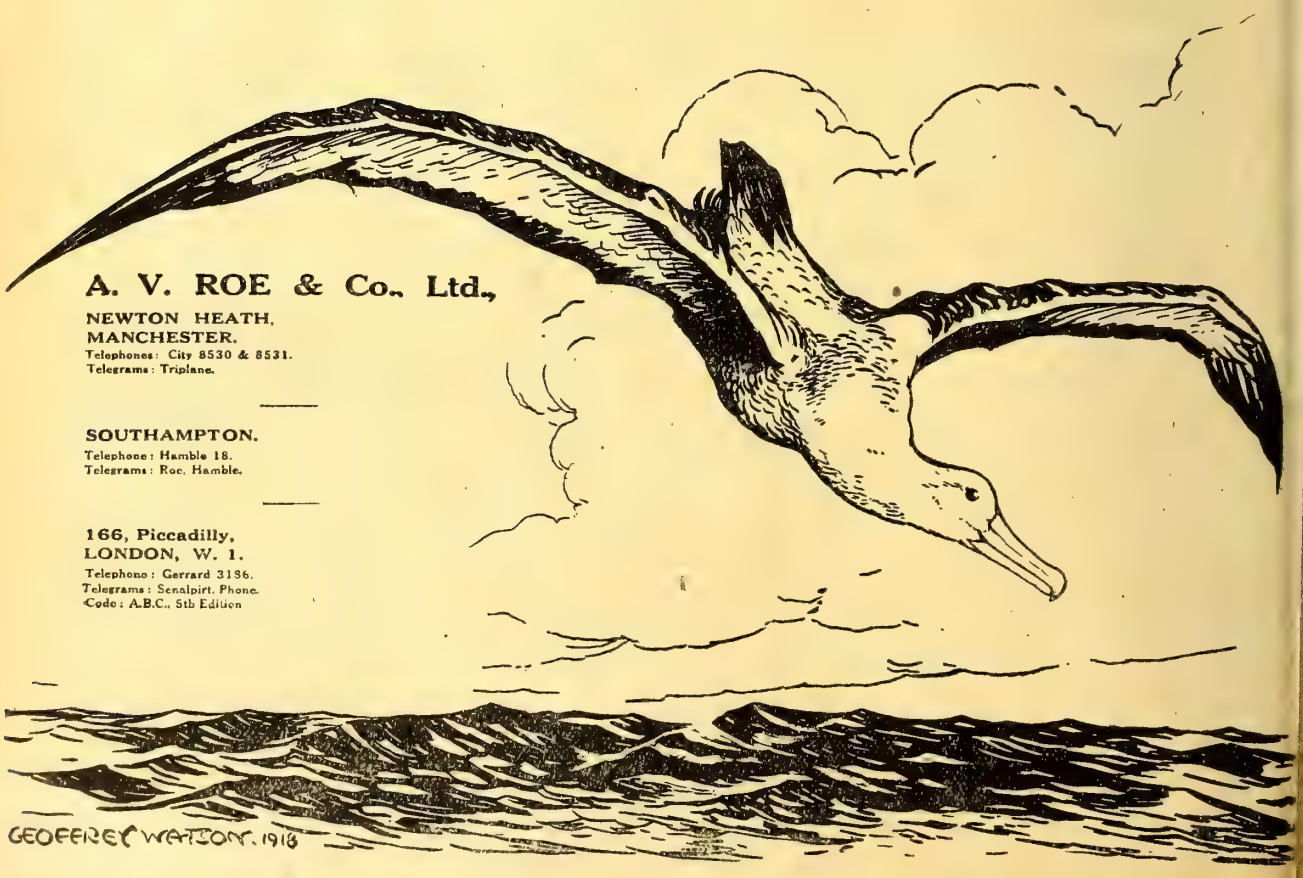
AVRO

AEROPLANES
AND
PARTS.

A. V. ROE & Co., Ltd.,
NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Sesalpirt, Phone.
Code: A.B.C., 5th Edition



The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON LORD ROTHERMERE'S RESIGNATION.

Much as all will sympathise with Lord Rothermere in the mental and bodily afflictions which he has given as the reasons for his resignation from the post of Secretary of State for the Air Force, it is hard to find in them either excuse or justification for his method and manner of handling the affairs of the Air Council so that the recently observed results should have accrued.

Lord Rothermere assumed office with a flourish of triumphal music from the sacred conches of Fleet Street. We were assured that he was a strong man, of vast organising ability, that he had made the Army Clothing Factory in Pimlico a model of productive fertility, that to him the running of multiplied newspapers was a simple business proposition, and that if from the Hotel Cecil—sanctified by the presence in the past of all the great commercial minds, and travellers, of the world—he did not propose to organise a new Heaven and new Earth he would, at any rate, give us a new Air, purified of the Hunnish microbes which therein float.

In the event we find him weak, a very shorn Samson, easily influenced in wrong directions, driving blindly at a task which he did not understand, which—being a military task—he was possibly incapable of understanding, and which he was too headstrong to sit still and study. The methods which perchance sufficed to comb grafters out of a Pimlico slop-shop—if they sufficed, for it is not certain that they did so—were not applicable to the higher and newer problems of war.

His brief career at the Hotel Cecil has been entirely regrettable. It is impossible to trace one act of his which has in any way assisted towards winning the war, towards developing the use of aircraft, or towards promoting order in that establishment. Bad as was the state of the place whose manners and customs won for it the pseudonym of the Hotel Bolo, its confusion is now merely worse confounded. Primeval chaos would appear as convincingly orderly as the carefully laid-out prospectus of one of Lord Beaverbrook's projected Canadian cities of the plain if compared with the organisation of the Air Ministry as Lord Rothermere left it.

Lord Rothermere's Letter.

When he assumed office he entered upon a big task. He has left a bigger task to his successor. His letter of resignation shows how little he appreciates either what he had to do or what he has done. Here is the text of that amazing document:—

Hemsted, Benenden, Kent,
April 25th, 1918.

My dear Prime Minister,—I desire to relinquish my office as Secretary of State of the Air Force at the earliest possible date.

The Royal Air Force is now one of the three established fighting Services of the Crown. The fusion of the Royal Naval Air Service and the Royal Flying Corps has been successfully accomplished.

At times I have thought I would not be able to accompany the new Force so far. My second tragic loss in the war ten weeks since caused and causes me great distress of mind and body. Every day the burden of work and responsibility seemed crushing, and I was suffering much from ill-health and insomnia. I felt, as I told you, my urgent primary duty to the Government and the nation required me to remain, if at all physically possible, until the date of the fusion, and such time after as would suffice to establish the success of the amalgamation. My departure before might have gravely deranged what is now one of the nation's arms of war and have jeopardised the success of the whole scheme. Lately I thought I might be able to remain, but a recurrence of bronchial trouble with insomnia effectually prevents this.

I have entered into these particulars because I wish you to know the difficulties under which I have been working.

I cannot close this letter without expression of my great regard and respect.—Yours very faithfully,

ROTHERMERE.

The Right Hon. the Prime Minister.

That the R.A.F. is an established fighting force is no thanks to Lord Rothermere, and if he had written "con-fusion" instead of "fusion" in his first sentence he would have been nearer the facts. Why he should assume that his departure should gravely derange one of the nation's arms of war is not self-evident. On the contrary, events have rather given one to think otherwise and oppositely.

From one who is said to be so strong a man one would have preferred to see a plain straightforward and dignified letter resigning his office without explanation. If he felt that he could not do the work there was no need for him to retire behind a smoke-screen of sentiment. Mr. Asquith made no such complaining.

Mr. George's Letter.

Mr. George's letter appears as the effort of one turning onto a smoke-screen a searchlight beam which, as such beams do, instead of illuminating the view of those whom it is supposed to assist, merely camouflages the real object the more effectively. Mr. George was ever a chameleon for protective colouring. The letter deserves the fullest possible publicity, so one does one's humble best to help:—

10, Downing Street, S.W.1.
April 25th, 1918.

My dear Rothermere,—I have received your letter tendering your resignation as Secretary of State for the Air Force with the deepest regret. Your work there has been of inestimable service to the nation, and time will bring with it a full recognition of your achievement.

It is no small thing to have taken over the conduct of an entirely new arm of the Service in the middle of a great war, to have extricated it from the difficulties which surrounded it, co-ordinated the two Services which made it up, and bestowed on its administration an initiative which has given the new force a real supremacy at the front. And all this has been done in such a brief period of time.

It is the more to be lamented that, having set the Ministry on its legs, you cannot remain to enjoy the fruition of your own brilliant work.

But I feel on reading your letter that I cannot press you to stay, much as the Government must suffer from your retirement. Your sacrifices to the national cause have been so heavy and the strain imposed on you so cruel that it would be impossible to deny you the right to some repose. Sympathy in these matters is generally best given by silence, but I am sure that you know without my telling you how much I

sympathise with you in your losses and in the way in which you have continued your public duties in spite of everything.

No Minister ever had greater difficulties to contend with than you had in effecting the fusion of the two Services, and the Air Force has every right to be proud of its first Secretary of State.

I am authorised by my colleagues to state that they share fully the views I have expressed in this letter.—Yours very faithfully, D. Lloyd George.

Possibly Mr. George's use of the ambiguous word "inestimable" in the second sentence is not intentional. That which is impossible to estimate may be either infinity or zero.

However, Mr. George is still more skilfully ambiguous in the second paragraph. It is not frequently possible simultaneously to agree with Mr. George and with the truth. Yet here one can do both. It is certainly no small thing to have done so much, as he says.

To take over a new arm in the middle of a great war, to extricate it from difficulties, to co-ordinate two Services, and to give the new Force a real supremacy at the front is a very great thing. It was done by General Trenchard between April, 1915, and the autumn of 1917. It was done before anyone ever heard of Lord Rothermere in connection with the affairs of the air.

The R.N.A.S. squadrons in France were co-ordinated excellently with the R.F.C. At home Lord Cowdray and Sir William Weir co-ordinated supplies for both Services. They were Sir Hugh Trenchard's real supporters—they and his excellent brigade-commanders at the front and his equally able training division commanders at home. These are the people who from the weakness of 1915 gave the new Force a real supremacy in 1917.

Lord Rothermere had nothing whatever to do with it. And Mr. George is wily enough not to say that he had. He merely says that what has been done was no small thing to do, and he leaves the doers anonymous.

In the next paragraph, however, Mr. George gives Lord Rothermere credit for having set the Air Ministry on its legs—which is quite a different matter from having given the new arm supremacy at the front. Here again Mr. George's words and the truth are parallel, if not coincident. Whatever credit, or blame, may attach to bringing the Air Ministry into being certainly belongs to Lord Rothermere, but it is well to remember that work may be brilliant without being in the least useful or even sensible—as, for instance, the embroidery on an R.A.F. cap.

At the very end Mr. George is as cleverly ambiguous as in his earlier phrases. It is again possible to reconcile his words with the truth when he says that no Minister has ever had greater difficulties than had Lord Rothermere in effecting the fusion of the two Services. The greater difficulties pertain to Lord Rothermere's successor, not to any predeceased Minister, for the fusion has still to be effected and the confusion is greater than before.

Not only Mr. George's colleagues but all who are on the inside of Air Force affairs will share fully the views which Mr. George expresses in his letter, and will share still more fully the views which he has still more skilfully avoided expressing, though one has endeavoured to do so for him. When one reads his letter with proper care one perceives how very early in the morning it is necessary to arise if one desires to catch Mr. George even half-asleep.

The Temple of Dagon.

One is sincerely sorry for Lord Rothermere, this modern Samson Agonistes. He was ill-advised ever to tackle the job, and he was seemingly worse advised after he had taken it.

There are many points in Old Testament history which leave one intrigued as to facts of interest. We are told in Judges xvi, 26, that Samson was led by a lad who indicated to him the main pillars of the temple of Dagon whereupon the house stood, and in verse 29 that he took hold of the two middle pillars, and, in verse 30, that he bowed himself with *all his* might, and that the house fell upon the lords and upon all the people that *were* therein, and that he himself perished in the crash.

But we are not told who was the lad who indicated the king-posts, nor whether he had the gumption to stand from under when he saw the crash coming. Such information would have added materially to the interest of the story.

Similarly one would very much like to know who was the lad who guided Lord Rothermere to the pillars of the Air Force Temple, and whether he got out in time to enjoy the performance. Aviators are so clever in dodging crashes that it seems possible that he did so.

One feels sure that the surviving Philistines built a very much better temple out of the wreckage, much as the A.S.Ds. at the front build better aeroplanes out of salvage. Probably they called in an experienced engineer to do the job, and he probably built the new place with a proper factor of safety, and with duplicated pillars, so that if anyone went blundering into them by accident or by intent he would not bring the whole place tumbling round his ears. And probably the engineer was a Clydeside Scot.

The Great Consolation.

One commends to Lord Rothermere, for the consolation of his lacerated soul, the words of one of the really great men of history. Abraham Lincoln, in his famous speech at the dedication of the National Cemetery at Gettysburg on November 19th, 1863, said:—

"The brave men, living and dead, who struggled here, have consecrated it far above our power to add or detract. The world will little note nor long remember what we say here, but it cannot forget what they did here.

"It is for us, the living, rather, to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us; that from these honoured dead we take increased devotion to that cause for which they gave the last full measure of devotion; that we here highly resolve that these dead shall not have died in vain."

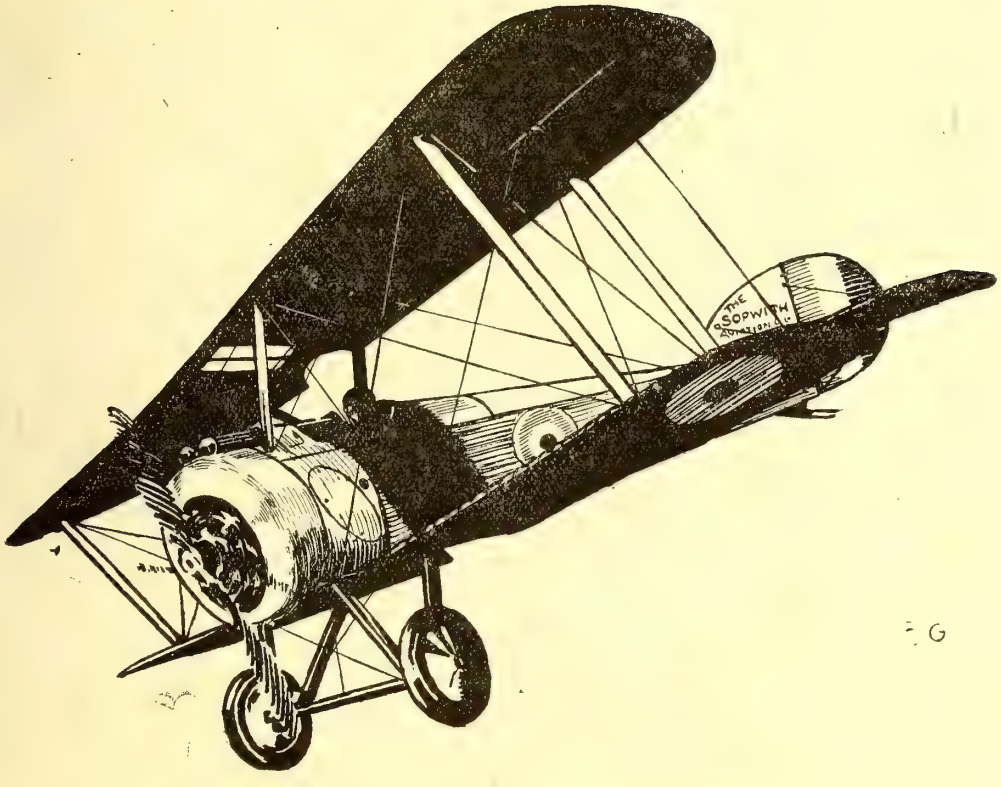
Work is the great consolation in all great sorrows. When that work is devoted to advancing still further the cause for which those dear to us have died we then find the greatest consolation. To-day one can point to scores of fathers, mothers, sisters, and brothers who are working earnestly for the advancement of aviation, and for the good of those who fly, because—not in spite—of the deaths while flying of those dearest to them.

They dedicate themselves to the great task remaining before them. And they find their consolation in that task. One knew such people before this war, when only a few of us were concerned in our little private war for the Conquest of the Air, a war which in proportion to the numbers engaged was as deadly as is this great world war. And one knows such people among those who have lost their sons and brothers in this newer war. They are the aristocracy of the Nation.

The Political Aspect.

However, there seems but little doubt that Mr. George and his friends had made up their minds, very soon after the outburst of feeling over the upheaval at the Air Ministry became manifest, that Lord Rothermere was to be thrown to the lions—if one may outrage zoology by likening politicians to such forceful mammals. Had it been the intention of the Government to stand by the Air Minister, when Mr. Pringle raised the question,

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

SBAC

Paris Office:
21, RUE DU MONT THABOR.

on the adjournment of the House of Commons on April 18th, he would have been duly crushed by Mr. Law or Major Baird, or if necessary by Mr. George himself.

The questioner being thus abolished the question would have been settled for good and all, until the Air Force Vote came to be discussed. By that time affairs at the Air Ministry might have settled down. Such is the trick of the trade as worked in Parliament.

But Mr. Law and Mr. George, having the keenest of political noses, scented the big trouble which was brewing and promised to give a full day, of the time in which the governing of the nation should be discussed, to a debate concerning the removal of a general. It is true that seldom has the House had an opportunity of spending its time on a better subject, but such a subject ought never to need discussion.

In any event the mere permission of such a debate meant throwing Lord Rothermere into the political arena to be torn to pieces by lions and jackals alike. And apparently Lord Rothermere, not having the spirit of a martyr, stood not upon the order of his going, but beat it for the tall timber of his baronial estate.

A New War.

Possibly the sacrificial tendencies of Messrs. George and Law were aggravated by a knowledge that either they intended to quarrel with Lord Northcliffe, or that Lord Northcliffe intended to quarrel with them. For, it has since been consistently rumoured—it may by now be confirmed—that Lord Northcliffe is resigning his post as chief propagandist in foreign parts.

This would seem to portend a war between the Multiple Alliance of the Harmsworth Press and the Double Entente of the Government. Such a fight should be vastly entertaining, and will probably be much appreciated as a little welcome comic relief by the real fighting men at the real front. The great majority of thinking people will watch the scrap with perfect impartiality, and will be strictly neutral, with perhaps a slight desire for a result similar to that which was alleged to have ended the battle of the Kilkenny cats.

The forthcoming campaign on the Fleet Street-Strand-Westminster front seems to turn on the inclusion of Lord Milner and Mr. Austin Chamberlain, two honest and able gentlemen, in the Cabinet, and on prospective doings at the Air Ministry. Readers of this paper will probably only be interested in the reinforcements, reserves, and casualties on the Bolo sector of the Strand front, and on these matters one hopes to be able to keep them well informed, even if the strategy and tactics employed may be too complicated for public discussion or comprehension.

The New Air Minister.

The appointment of Sir William Weir to be Secretary of State for the Air Force seems to be one of the few good actions to the credit of this Government. Sir William has proved himself to be a great producer of matériel. It has been made known publicly, though it has long been known to many, that under his driving force the output of aircraft has overtaken and surpassed the output of pilots and of the officers and men necessary to handle the machines on the ground.

Further increase in output would mean putting machines into store till they became obsolete. Even the heavy losses of aircraft and spares in the recent German advance have been more than made good from accumulated reserves. To have produced such a state of affairs is an achievement of which Sir William Weir may justly be proud.

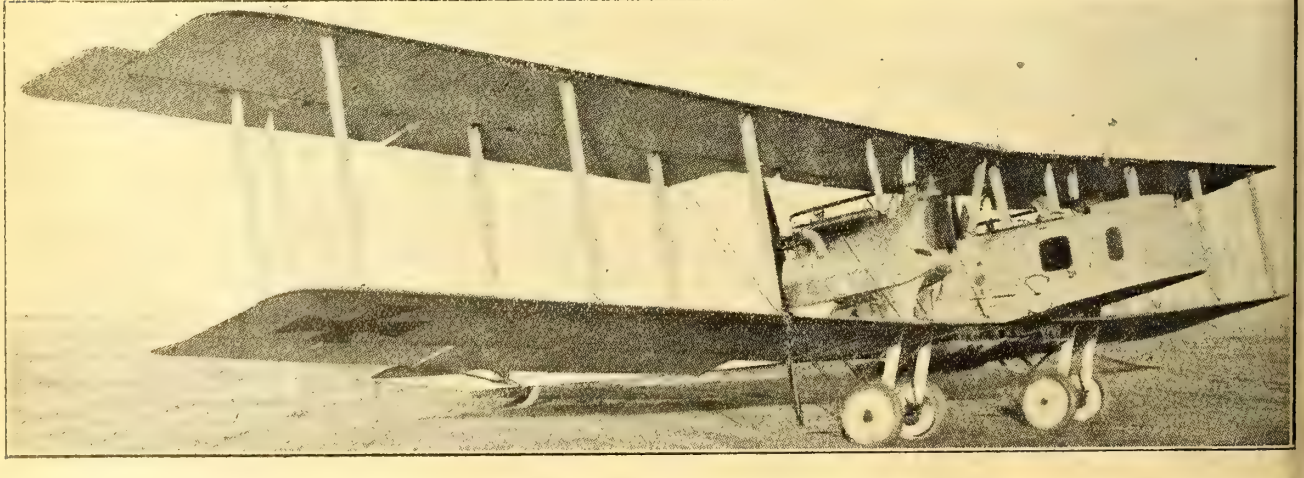
At his particular job Sir William has made good. One may therefore hope that he will make good as Air Minister. He is determined without being headstrong, and he is cautious without being timid. He is not too big to work amicably with others who know their own particular jobs. On the other hand he is not weak and easily influenced either by bluff or by flattery.

He is said, by soldiers who have had intimate dealings with him, to have a remarkable grasp of the problems of war. One knows from his own actions and statements that, while as a producer he realises the value of standardisation, as a student of air war he realises equally well the importance of quick changes of types to meet the changing needs in the field. He himself said some six weeks ago that if we are to give pilots the best aeroplanes we must face constant changes and developments in the types of machines. That statement alone should win for him the confidence of the fighting men of the Royal Air Force.

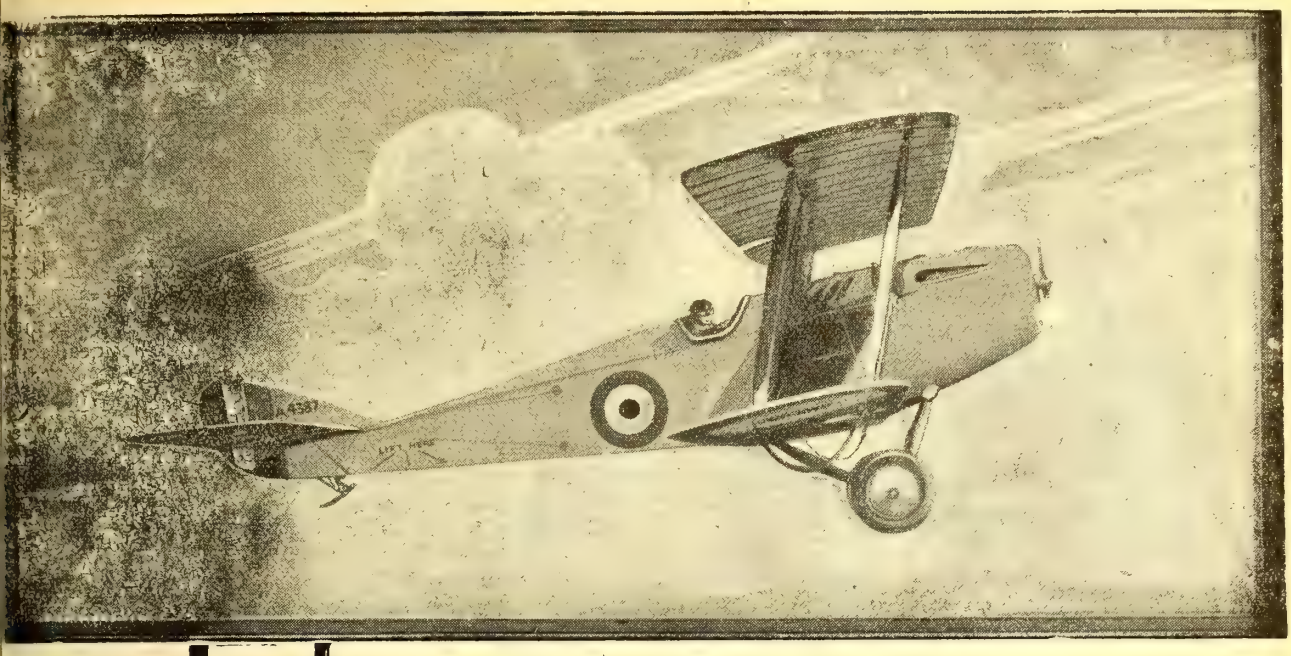
As an engineer who knows that if a man is to do his work well he must be allowed to do it in his own way he is not likely to try to interfere with the organisation of personnel or with operations arranged by the Service members of the Air Council, and if he proffers his opinion to them on their side of the air war that opinion will be well worth considering.

The Problem of Production.

One's only fear in the past, when Sir William Weir was suggested as Air Minister, was lest in obtaining a good Secretary of State we might lose a better Director General of Aircraft Production. Since then, however, Sir Henry Fowler has been appointed Deputy D.G.A.P., and has had time to prove his worth. In the nature of



Three-quarter Front View of a Gotha Grossflugzeug. This is, one believes, the first photograph of a complete Gotha to be published in this country.

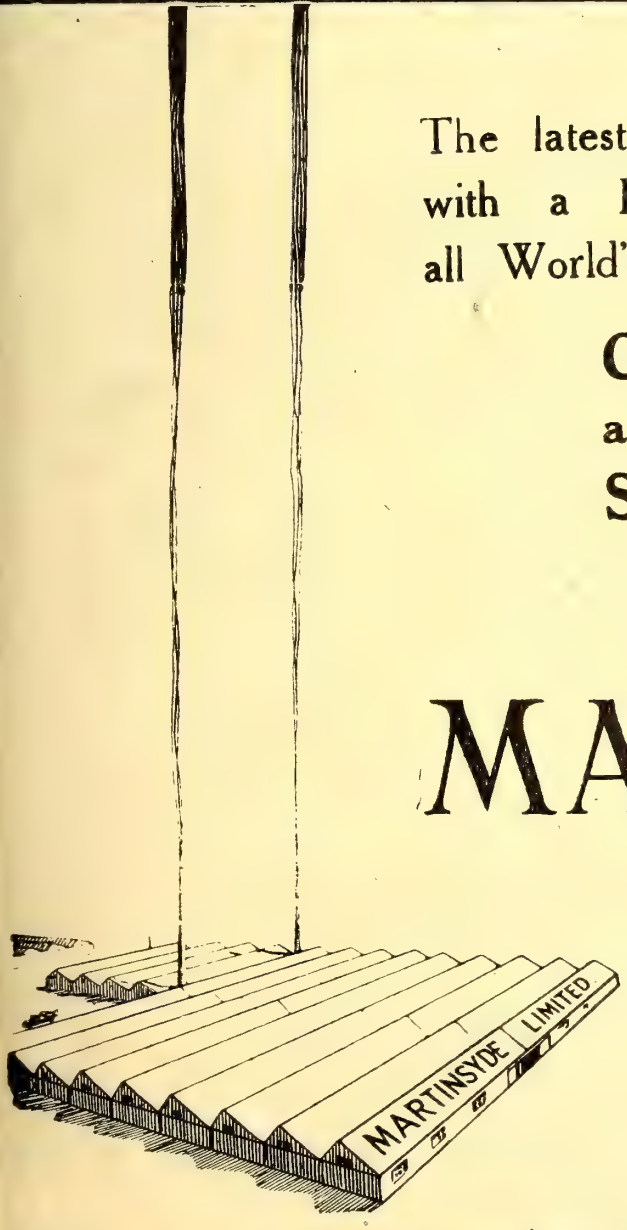


The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds all World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE



BROOKLANDS.
Head Office
WOKING, Surrey.

things he would automatically take Sir William Weir's place. In such an event there need be no fears on the score of aircraft production.

Sir Henry Fowler has won the good-will of everybody since he came to the Air Ministry. He knows good work when he sees it, and he knows a good man when he meets him. He is a practical engineer first, foremost, and all the time. When he is dealing with aircraft constructors he can talk to them as one who knows as much as they know themselves, and generally some more. And he has the priceless gift of being a man for whom other men are pleased to work.

He was chief mechanical engineer of the Midland Railway before he took to serving his country. Those who knew the Midland before the war know that in things mechanical it represented high-water mark among railways. Of all engineers the railway engineer seems always to be the most broad-minded and the quickest of perception, and of railway engineers the locomotive superintendent is the broadest and quickest mentally.

A British workman has said that there is no bad beer, but that some beer is better than others. Similarly one might say that there are no bad loco-supes; but that some loco-supes are better than others. Sir Henry Fowler strikes one as being the ideal loco-supe. If one wants a mechanical job well done, none can do it better than a railway engineer. Therefore one hopes to see Sir Henry Fowler take another step upwards on the path which he has followed with such conspicuous success since he became concerned with aircraft production.

A Proper Air Council.

One begins to have hopes that all may shortly be well with the Royal Air Force. If it were possible to combine in one Council the driving force and canny keenness of Sir William Weir, the great soldierly qualities and personal magnetism of General Trenchard, the organising cleverness of General Sykes, the naval knowledge and adaptability of Captain Groves, the political experience and worldly wisdom of Sir Henry Norman, and the engineering ability of Sir Henry Fowler, we should come very near having the ideal combination with which to conduct war in the air.

All are men of outstanding qualities, each in his own sphere of action. All know the needs of active-service aviators and the mechanical devices which are necessary to the execution of their duty. All recognise the vital importance of supreme Air Power to the existence of the British Empire. All are loyal subjects of His Majesty the King.

For each of them there is a place on the Air Council to which he is pre-eminently fitted. Is it too much to hope that if there are any little personal differences between any of them—and if there be such one is ignorant of the fact—they would hide away those differences for the time being and unite in helping this afflicted country to get along with the war?—C. G. G.

A SUGGESTION FOR THE WAR CABINET.

The official announcement that Major-General Sir Hugh Trenchard is not to sever his connection with the Royal Air Force will cause a feeling of intense relief to every officer and man in the Flying Services.

At the moment of writing his precise appointment is not announced. It is hardly likely that he will be created Commander-in-Chief, R.A.F. That would be too obviously the right thing for any Government to do for any likelihood to occur of its actually happening. It may be, however, that he will become C.-in-C. in effect, if not in name, with some such office as Inspector-General, or other equally comprehensive and non-committal title.

There is, nevertheless, a chance for the Government to do the really great thing if it has the moral courage and the necessary tact. It was suggested a week or so ago by M. Lasies, Deputy for the Seine, that an inter-Allied command for the Flying Services is desirable, such a command being analogous to the combined command of the Allied Armies on the ground. If such scheme were ever put into effect, one suggests that none could be more fit to command the Allied Air Forces in the field than General Trenchard. It is known that the admiration of the French aviators for him is little, if at all, less than that of the R.F.C. for its great leader. The French claim him as their own by virtue of his Norman ancestry. They would, one is assured, accept him as their aerial commander with enthusiasm, and would support him loyally in every respect. The Americans equally accept him as the great leader of men which the history of the war has proved him to be.

As C.-in-C. of the Allied Forces General Trenchard would have a job greater by far than that of Chief of Staff, R.A.F., or even C.-in-C., R.A.F. That such may be the outcome of the present upheavals will be the cordial wish of all who have served with him.—C. G. G.

THE NEW AIR MINISTER.

It is officially announced that the King has been pleased to approve the appointment of Sir William Weir to be Secretary of State for the Air Forces, in succession to Lord Rothermere.

THE LATEST RESIGNATION.

The Parliamentary correspondent of the "Daily Chronicle" writes on April 25th :—

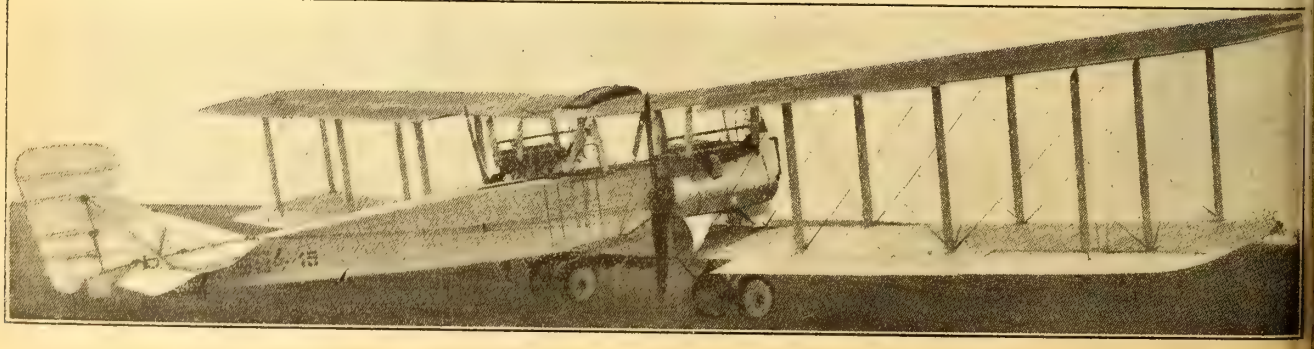
Sir Arthur C. Roberts, K.B.E., a chartered accountant of high standing, has relinquished his appointment as expert financial adviser to the Air Ministry. He did excellent work in that capacity, and also earlier in the financial re-organisation of the Army Clothing Department, Pimlico. In both cases he gave his valuable services without remuneration.

His resignation from the Air Ministry is due to disagreement from Lord Rothermere's policy in regard to certain matters of administration.

CALLED TO THE BAR.

The following are among the names of those called to the Bar at the Inns of Court on April 24th :—

Middle Temple.—Sec. Lt. Sir C. C. Mansel, Bt., R.F.C.; Lt. H. S. Nichols, R.F.C.



Three-quarter Rear View of a Gotha Grossflugzeug.

SAUNDERS OF COWES

FOR nearly 90 years the firm of SAUNDERS has been established on the Thames and at Cowes, Isle of Wight. They have long been known as constructors of fast power boats, and are holders of all the world's records for speed.

¶ They are also pioneers in the design and construction of the *first successful Flying Boats in this Country*, which were taken over by the Navy *two years before the War*.

S. E. SAUNDERS LTD.,

Head Office and Productive Works: East Cowes, I. of W.
Erecting and Testing: Solent Yard, Cowes *and* Osborne Works, East Cowes, *for Seaplanes; for land machines:* West Medina Aerodrome, East Cowes.

Telegrams: Consuta. 'Phone: Cowes 193 (4 lines)

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTION SBAC

The Air Force Debate.

The debate in the House of Commons on April 29th was obviously of great interest to the Flying Services, in that it turned on the reasons for the removal of General Trenchard and his future connection with the Royal Air Force. The gallery and the seats for "strangers" on the floor of the House were full of officers of the R.A.F. and of others concerned for the good of the Services, and one could hear a distinct sigh of relief when Mr. George announced that the services of the great leader of the R.F.C. were not to be lost to the Air Force.

Uncomfortable Mr. George.

Mr. George refused to discuss the reasons for Sir Hugh Trenchard's resignation, and was obviously ill at ease in his efforts to shield Lord Rothermere. One can well understand his discomfort in view of all the circumstances. The House was distinctly hostile to him, despite all the good "party" men having been brought so well to heel, for there comes a time when even a politician feels that the welfare of the Services is more important than party.

The fact that Mr. Pringle's amendment, on which the discussion was based, was turned down by 127 votes to 37 does not in the least indicate the feeling of the House, it merely indicated that Mr. Lloyd George was let off with a caution in return for retaining Sir Hugh Trenchard's services, and for going back on Lord Rothermere's ill-advised actions. It was not surprising, therefore, that Mr. George's defence of the ex-Minister for the Air Force failed to convince anyone of their sincerity, for, as has been said elsewhere, Mr. George has a keen political sense, and he would have had to be preternaturally stupid not to gauge the feeling of the House in the first five minutes of the debate.

He worked off his ill-temper in an explosive but weak attack on Lord Hugh Cecil, who, in the course of a distinguished panegyric on General Trenchard made a reference to amateur strategists in the Cabinet which gave Mr. Lloyd George an excuse for his outburst. Lord Hugh Cecil's methods are too much those of a gentleman of the old school to permit him to deal with Mr. George as the occasion really demanded, and as the opportunity permitted.

Major Baird's Part.

In the ordinary course of events Major Baird (Under Secretary for the Air Force) should have introduced the Air Force Vote, in which case one might reasonably have expected an enlightening speech from Sir Henry Norman, the additional member of the Air Council, but, whether by sheer lack of intelligence or through malice aforethought, Major Baird chose to finish up the debate, thus blocking any possibility of Sir Henry Norman's speaking. Major Baird's effort was in his usual offensively jaunty manner and was full of his usual blatant inaccuracies, which, if not actually intended to deceive, have the effect of misleading the ignorant.

One of the most important changes yet to be accomplished in the Air Ministry is the removal of Major Baird and his replacement by someone, if such another can be found, of the quality of Mr. Ian MacPherson (late Under-Secretary for War), whose utterances and methods stamp him at once as a gentleman and a statesman, as distinguished from a genteel-man and a politician.

A Valediction.

One takes this opportunity of congratulating Mr. MacPherson on his well-deserved promotion to be Vice-President of the Army Council, and Deputy-Secretary of State for War, and of prophesying that, subject to his retaining his health and strength, he will in time become the leading statesman of this country. Men who are able, honest, or honourable are so scarce in political life that one who is all three at once stands out noticeably, and marks himself for future greatness.

Such is Mr. Ian MacPherson. It is greatly to be regretted that his capable brain is no longer concerned with the affairs of the R.F.C., for in all his dealings with the Corps, as Under-Secretary for War, he has displayed an intelligent appreciation of affairs and intense human sympathy. One only wishes that the Air Ministry could claim him for its own.

THE DEBATE.

Space and time are lacking in which to record the debate in full. Nor indeed would it be worth while to do so, for little was said which tended to advance progress. One gives, therefore, an abridged report taken in the main from the "Times" newspaper:—

The House having gone into Committee of Supply on the token vote of £1,000 for the expenses of the Air Ministry,

Mr. Pringle moved a reduction of the salary of the Minister. He believed he was expressing the feeling in all quarters of the House when he expressed deep sympathy with the late Secretary of State for the Air Ministry, who for reasons of ill-health and private sorrow had been compelled at this juncture to relinquish his post. But he thought that, in spite of Lord Rothermere's retirement, a discussion on the recent changes in the Air Ministry was necessary because, as they had been informed by the Leader of the House, the decision taken with regard to the late Chief of the Air Staff was not only the decision of the Secretary of State, who had retired, but the decision of the War Cabinet. Further, the House had been informed that the matter that issued in General Trenchard's resignation was a question of policy, and that being the case it was the right of the House to know what were the differences of policy between the Minister and his Chief of the Staff that ended in the resignation. Another strong reason for discussion was that the House was anxious that the best use should be made of the undoubted abilities of the late Chief of the Air Staff, whose resignation, announced without any explanation, had given rise to a great deal of unrest in the public mind as to the conduct of the Air Service, and had brought about what was of far greater importance, a condition of complete consternation throughout all ranks of the Air Force. A number of semi-official explanations had been offered in the usual way. It had been stated, by people who gave the impression that they knew or ought to know, that General Trenchard was not altogether the officer qualified for the post which up to a fortnight ago everybody believed that he filled admirably, and that he was not fitted to be the head of a thinking department, whatever that might mean.

The only approach to an explanation which had been given in this case was the statement of the Secretary of the Air Ministry, that the difference between the late Secretary of State and the late Chief of the Air Staff related to the views which they held as to the functions of the latter. It might be that the explanation was to be found in Lord Rothermere's recent letter to Lieutenant-Colonel Faber, in which he stated that he proposed to establish a strategetic council. Possibly that might be the "thinking department." Obviously all the duties relating to strategy and tactics had been entrusted to the Chief of the Air Staff,—and one would imagine that to be the most effective arrangement. Experience of war councils and strategic committees pointed to the advisability of concentrating responsibility in such matters upon a single individual. It could only be assumed that the War Cabinet accepted General Trenchard's resignation with the greatest reluctance and regret, and that they took their decision because they preferred to retain Lord Rothermere and allow General Trenchard to go. Now that a change had taken place in the occupant of the office of the Secretary of State the War Cabinet had an opportunity of changing its position in regard to General Trenchard.

Lieut.-Col. Sir H. Verney said that when he had put a question to the Chancellor of the Exchequer as to whether he was aware of the disgust in France at the dismissal of Sir H. Trenchard he replied that he was not. From Sir Douglas Haig downward the feeling in France was unanimously one approaching disgust with what had occurred. He was sure the Germans would say that the admitted superiority of the British Air Force was due to Major-General Trenchard. Of course, he could not prejudge the case. He did not know the facts, but he felt entitled to say that those who were actually serving in France held one opinion—that of disgust at the dismissal of General Trenchard. Unless some palpable and obvious reason was given for the dismissal, or unless they could be told that this gallant officer would either be reinstated or would be given work in which his unrivalled experience would find scope, he should vote with the hon. member against the Government.

Lord Hugh Cecil said that he had received from one or two friends words of counsel against speaking in that debate because of the circumstance that he was, a short time ago, occupied in a very subordinate position in the Air Ministry. As a matter of fact that would not have prevented his speaking, as it was not his desire to say anything controversial about anything that was past; but as his connection with the Air Ministry was at an end obviously his mouth was free. He was sure they all agreed that where the public interest was seriously concerned, and especially in war-time, no mere question of etiquette should stand in the way of a member doing public service. He held most strongly that the first duty of every member of that House was to his constituents.

They often thought of that House as a purely democratic body; but a member of Parliament also formed part of the great sovereign authority of the country, and any duty arising out of that most honourable membership must take precedence of everything else. Of course, personal honour came before any official duty even of the highest, and a member of Parliament was bound in honour not to make use of any information which came to him in any official relation; but to go beyond that would be seriously to diminish the usefulness of a member in debate, and especially to curtail criticism of the Government which could not be suffered to be weakened in any way whatever.

In regard to the resignation of Lord Rothermere, he desired to express his warmest sympathy and his deep regret for the tragic circumstances which had brought it about. But he could

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."

Telephones:
3906 BRISTOL
(Private Branch Exchange)

not speak so respectfully of the Prime Minister's letter accepting the resignation. Perhaps the kindest thing to say of it was that it was the outcome of a strong Celtic imagination, for while it purported to be a statement of fact, it was rather an essay in hagiology.

There was now a new Air Minister, and he desired heartily to congratulate the Government on the appointment of Sir William Weir, a man in whom the strongest trust could be placed. But it was indisputable that the Air Service had suffered great losses in the resignations of Sir David Henderson, who had presided over it almost from its commencement, and General Trenchard, who had an extraordinary capacity for organisation and knowledge of detail. General Trenchard was also a great leader, and in that respect he was almost impossible to replace.

It seemed to be commonly supposed that by the mere multiplicity of aeroplanes the efficiency of the Air Force was increased. Nothing could be more untrue. The life and efficiency of the aeroplane lay in the flying pilot. It was because of the character of our aviators that we could say that our Flying Force was the greatest in the world. That was due partly to the fact that we had such splendid material to work upon, but also because the leaders of the corps always kept in view the improvement of the *moral* of the pilots. A young officer whom he chanced to meet casually the other day said to him that the Royal Air Force might become the finest Service of the country, or might become absolutely rotten and degraded. Leadership was in all military matters a thing of the highest concern. But it had never been so great in the Army or Navy as it was now in the Air Force, and because of the temperament of the men it was never so easy to destroy the *moral* of infantry or cavalry as it was to destroy the *moral* of the Air Force. It was in that respect that General Trenchard was an indispensable person. His knowledge of the temperament of the men was most profound and subtle. The *moral* of the force was of the first importance. It might be illustrated by the unfortunate expedition to the Dardanelles, the true error of which was not in supposing that an attack on the Dardanelles was not a wise thing to do, but in forcing it on their military and naval advisers against the grain. Nothing was more foolish than to try and impose strategical ideas on those who had to carry them out unless you could induce those persons to fall in with your ideas and carry them out as though they were their own. If they had a man like Sir H. Trenchard at the head of the Air Service, perhaps they might find that he would not always listen to the ideas of every amateur strategist in the Cabinet quite as sympathetically as that strategist in the Cabinet might desire.

Mr. George: Why does the noble lord say that? No amateur strategist in the War Cabinet has ever suggested anything of the kind to Sir H. Trenchard. The noble lord has no right to say that.

Lord H. Cecil: I am not suggesting that; I did not think that the Prime Minister was so very sensitive.

Mr. George: Sensitive, yes. There is so much talk of this nature going around. I cannot imagine any such suggestion coming from the War Cabinet to Sir H. Trenchard.

Lord H. Cecil: I am very glad to hear the right hon. gentleman say so; it entirely accords with my own impression. I will tell the right hon. gentleman quite frankly what was in my mind. What I have heard Sir H. Trenchard criticised for in conversation is that he will not accept new ideas if they are put before him. I believe that to be entirely untrue. All that was in my mind was that conceivably somebody had said something to him which he had not received respectively.

Mr. George: Not in the Cabinet.

Lord H. Cecil: I am very glad to hear it. Considering that the Prime Minister has lost a great public servant, I really think he need not show himself so very sensitive when we are pointing out how great the loss is. The right hon. gentleman really seems to care about nothing except his own retention in office personally. (Cries of "Withdraw" and "Get on with the war.") All and every public servant may resign office, and if anyone so much as discusses the subject the Prime Minister is angry and interrupts. I really do not know why the right hon. gentleman is angry if it be not for that reason.

Mr. George: The noble lord surely ought to know what I mean. He talks about the interference of amateur strategists in the Cabinet with Sr H. Trenchard. He has not the slightest ground for it, and instead of apologising, as he ought, he makes one of the most offensive suggestions that it is possible to make.

Lord H. Cecil: I used no such language. I am entirely within my rights. Everything I said was right and proper, and I certainly am not going to withdraw a syllable. If the right hon. gentleman supposes that he is going to browbeat critics in this House he ill understands the House of which he is a member, or the particular member who is now addressing the Assembly.

The noble lord, in conclusion, earnestly begged the Government to consider that they had lost a great national asset, and implored them to retrace their steps in the name of our common patriotism and common country.

The Prime Minister's Reply.

Mr. George: I am very anxious in the present state of public affairs, especially military affairs, to avoid anything in the nature of unnecessary disputation, and I am especially anxious to do so when we come to discuss a force like the Air Force and the internal administraton of this Force, and I shall endeavour, if possible, to avoid anything in the nature of personal recrimination or dispute. So far as I am concerned, I shall certainly do nothing to add to the temperature. I have this afternoon listened to the criticism of the action of the Government, criticism which has been advertised in advance, and I listened to the speech first of all of my hon. and learned friend the member for North-West Lanark (Mr. Pringle), and I confess that after listening most carefully I really do not quite know what he was driving at.

I now come to the speech of the noble lord (Lord H. Cecil) and with regard to most of it let me say at once I agree. Certainly I agree with every word he said about the great, the distinguished, and the remarkable service rendered by Sir Hugh Trenchard to the country. There is not a word of that which the Government does not adopt. There is one proposition, however, he laid down which I certainly do not accept. I am referring to his claim that members of Parliament serving in the various branches of the Army have a different standard of discipline to others who are not members of Parliament. What is the position with regard to that? It is, I think, very derogatory to the whole discipline of the Army.

The Army Council called my attention to the fact that there were several members of Parliament who were serving in the Army and who were utilizing knowledge which they got as officers in the Army in order to criticise Army administration in this House, and they said: This is extremely unfair to the Higher Command, it is extremely unfair to those who have the direction of the Army, and these members ought to decide between being members of Parliament and being officers.

Commander Bellairs: Will my right hon. friend be specific on this point? Does he claim that members of Parliament who belong to the Army and Navy are not free to criticise in this House?

Mr. Harcourt: The right hon. gentleman said there was no the same standard of discipline from serving officers who are members of Parliament. I made it my business to ascertain whether that was so, and I was told the standard of discipline was the same.

Mr. Billing: May I ask the right hon. gentleman whether having regard to the opinions expressed, he will take steps as the head of the Government to see that this does not occur again?

Mr. George: I do not say that I can state in clear, precise, technical language the exact limit, but what I mean is that an officer actually serving, whether in the trenches or elsewhere ought not to use information he gets in that capacity for the purpose of criticising the Command, whether it is civilian or military, or for the purpose of praising it. It comes to the same thing.

Lord H. Cecil: The right hon. gentleman would not get intelligent criticism at all.

Mr. Lloyd George: What it really means is that a member of Parliament has to choose. You cannot administer any Department, military, naval, or civilian, without some difference of opinion between the experts and the civilians; they always arise. The civilian is there to put the civilian point of view; the expert is there to give expert advice. Differences must arise especially if you have got men of strong individuality on both sides, and the only way to settle them is that there shall be no undue political interference on either side. I am certain many disputes would have been settled if they had been left alone in that respect.

Sir E. Carson: Is it not a fact that the civilian is always the judge?

Mr. George: He is the head of the Department. That is the British Constitution—that the civilian has been put there as a judge. It is even a principle of the law that the juryman who is inexpert is the man who sits in judgment upon even the Judge. He has got the final say in the matter; he is an inexpert who has the final say.

Now I come to deal with the general, I will not say criticisms but general observations which have been made. I again repeat that the Government agree with everything that has fallen from either of the two hon. members about the services of General Trenchard. I do not accept the statement made by the hon. member, who comes here to speak on behalf of those who served in France, that General Trenchard has been dismissed. He insisted upon using those words. General Trenchard resigned. If the War Cabinet or his Minister had suddenly dismissed him that would have been a very different set of circumstances. General Trenchard put in his resignation for reasons which I do not want to enter into, because it involves a dispute which the noble lord himself has not thought fit to enter into, as I think, wisely. I do not think anything would be gained by entering into these controversies inside the Air Board.

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines
like
Rolls-Royce Cars
are the
Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

The Cabinet asked General Smuts to finally look into the matter. General Smuts has rendered very great services indeed to the Air Force in the course of the last two months. There is no one who doubts his tact, his sagacity, and his knowledge of war. Acting upon the investigations which he made, and without expressing any opinion upon the merits of the dispute between the civilian heads of the Department and the Chief of the Staff, he certainly came to the conclusion that General Trenchard's special qualities were not used to the best advantage in his position as Chief of the Air Staff.

If the Committee listened, as I know they did, very carefully to the description given by the noble lord of General Trenchard, it was the description of a great leader. He said something about Nelson and Wellington. I am not sure that either of them could have been the Chief of the Air Staff. That is not a criticism of Nelson. That is not his quality, and I agree with the noble lord that the qualities of General Trenchard are qualities of the Nelson type—his highest qualities are Nelsonian qualities of mind and inspiration. I do not know to what extent Nelson had great qualities of organisation. He must have had them to a considerable degree, but, at any rate, they are the qualities of a great leader of forces.

I can assure the noble lord that there is an essential difference between the kind of qualities which you require for a man who sits in an office to think out carefully, slowly, perhaps laboriously, plans not merely for to-morrow, not for the day after to-morrow, but for next year—because that is the business of the Chief of the Staff of the Air Board, to think out the work of the Department for months to come, for this year and for next year—that there is a vast difference between the qualities required for that and the qualities you require for great leadership and inspiration of the Air Force.

Having been faced with the accomplished fact of the resignation of General Trenchard, having to consider as between General Trenchard and General Sykes for the position of Chief of the Air Staff, there was absolutely no doubt in the minds of those who investigated the matter on behalf of the Cabinet that for that particular post General Sykes's qualities and mind were better adapted than those of General Trenchard. That is not a criticism of General Trenchard, or it would have been a criticism of the Duke of Wellington or Nelson to say that they were not fitted for Chiefs of the Staff, but that they were very great leaders.

That was the position with which we were confronted, and I have no doubt at all that after looking into the matter, and after hearing what has been said on the subject, not merely by General Smuts, but by the presiding head of the Air Force, of the Air Services, that the Cabinet came to the right conclusion.

Sir William Weir's Work.

The noble lord spoke in the highest possible terms of Sir William Weir. He is quite right. General Trenchard has rendered services to the Air Force which are incalculable, and so has Sir William Weir, and the services which he has rendered are not merely the services of a manufacturer who increases the supply. No one knows better than the noble lord that Sir William Weir has made a special study of the Air Force. He has been thinking out the best methods of using that great Service, and a good deal of the efficiency of the Force at the present moment is due to the fact that Sir William Weir went outside his special functions of manufacture and thought out in advance the kind of thing that could be done by means of aeroplanes—things which were not thought of at the moment by any other expert. There are machines of a type used for particular purposes now which are there because Sir William Weir thought of them in advance, a year ago.

Having a great knowledge of the air, and feeling that a good deal could be done outside the limits which had then been laid down for aerial activity, Sir William Weir planned machines, and now there is not a general in the Air Force who would not admit that a very large measure of the efficiency of the Force is attributable entirely to the fact that Sir William Weir showed foresight which was beyond that shown by any other member of the Air Board.

When you come to consider whether it is desirable to turn out the present Chief of the Staff of the Air Board and to put General Trenchard in that post instead of using his services where they can be of more advantage to the Air Force, then the opinion of Sir William Weir must necessarily count with the Government. He has absolutely no doubt upon the subject—none. That is not the best way of using the great services of General Trenchard, and there is no man with greater admiration for General Trenchard than Sir William Weir. The noble lord and the right hon. and learned gentleman know perfectly well that Sir William Weir and General Trenchard got on without any difference of opinion or any dispute. Nothing could be better than the co-operation between those two men.

There has been no difficulty so far as Sir William Weir is concerned, but it was his definite and deliberate opinion that for the particular kind of work which you want a Chief of Staff to do General Sykes is better adapted; but he also believes that General Trenchard's services ought to be retained in the Air Force.

General Trenchard to Remain in the Air Force.

I am very glad to be able to say that there is every hope that General Trenchard's services will be retained in a position of considerable power in the Air Service. As a matter of fact two or three positions were offered to him in the Air Service, but for reasons which were quite honourable to him he refused them. I need not go into those reasons, but I may state that he felt that he might be displacing someone or other, and a man of the honourable nature of General Trenchard did not wish to be placed in a position not a little embarrassing and distressing to himself. Sir William Weir is confident, now that General Trenchard's services are to be retained in the Air Force, that he will not be placed in the position where there is not scope for his varied powers to be exercised in the future.

Mr. George then proceeded to eulogise Lord Rothermere and thereafter continued:

I am perfectly certain that the House and the country will be anxious to give Sir William Weir every opportunity to do his best to increase the efficiency of the Force, especially at a time when there is such a great strain upon it. Everything should be done that can be done to avoid friction, differences, and disputes, and I do not think there will be any perpetuation of this controversy in the Air Force itself. I do not conjecture, I know, that General Trenchard is the last man in the world to desire that. He is willing and anxious to co-operate with the present head of the Air Force, and I trust that the House, without entering into disputes which are thoroughly unprofitable, will now allow the new Air Minister the opportunity of developing on a greater scale, with the assistance of an extremely able Chief of Staff and the co-operation of General Trenchard in order to enable the Air Force to render in future even more brilliant service than they have done in the past.

Mr. Asquith's Views.

Mr. Asquith: There are two points which I think all the House will have heard with much satisfaction, or at least with considerable sympathy. The first is the welcome intelligence that the unrivalled services, for such they are, of General Trenchard in the Air Service are to be retained in that Force. We should be glad to know what particular functions have been assigned to him. It is not enough that he is not to take one of the offices which he has chivalrously refused to take on the ground that he might supersede others; what we would like to know is whether he is to be put in a position where he will have scope for his unexampled powers of organisation and leadership. The second point in my right hon. friend's speech which I think was generally acquiesced in by the House was his expression of heartfelt sympathy with the personal disabilities that have fallen upon Lord Rothermere, and, next, his equally heartfelt recognition of the eminent qualifications of his successor for the post to which he has been appointed.

Now, to say a word or two about the particular subject of this discussion. Let me say at once, lest I should fall under suspicion, that I have not, and I regret it very much, the honour of the personal acquaintance of General Trenchard, but I know a great deal about him. I have followed the history of the Air Service from its cradle onwards, and in those infantile days, long before the war, we owed an enormous deal to men whose services in that respect are now hardly remembered, particularly my right hon. and gallant friend now fighting at the front who was then Secretary of State for War (Brigadier-General Seely), and I will very gladly add General Sykes, who has now been appointed Chief of the General Staff of the Air Force, and, when I was Secretary of State for War, some time before war broke out, I was brought into full cognisance of his great expert knowledge in these matters. But there is not a man in this country to whom the Air Force is under such a debt of obligation as to Sir Hugh Trenchard.

When people talk with that superficial and often colossal ignorance to which we are accustomed in certain of our critics, when they speak of General Trenchard as a man deficient in powers of organisation, they are talking what every one who knows anything of the Air Force or of General Trenchard knows to be absolute nonsense. I have seen a great deal of organisation—military, naval, and civilian—and I say without hesitation I have never come across a finer organiser than Sir Hugh Trenchard. He was appointed, and I think wisely appointed, Chief of the Staff. That appointment was not made, I presume, without full consideration of the claims and qualifications of possible competitors. Without a dissentient voice so far as I know in the Army, Navy, or Air Service itself, he was nominated to that post. We do not know now how it was that it was discovered that his special qualifications were not particularly fitted for what seemed to be, in the opinion of some authorities, at any rate, the very mysterious and nebulous function of Chief of the Staff.

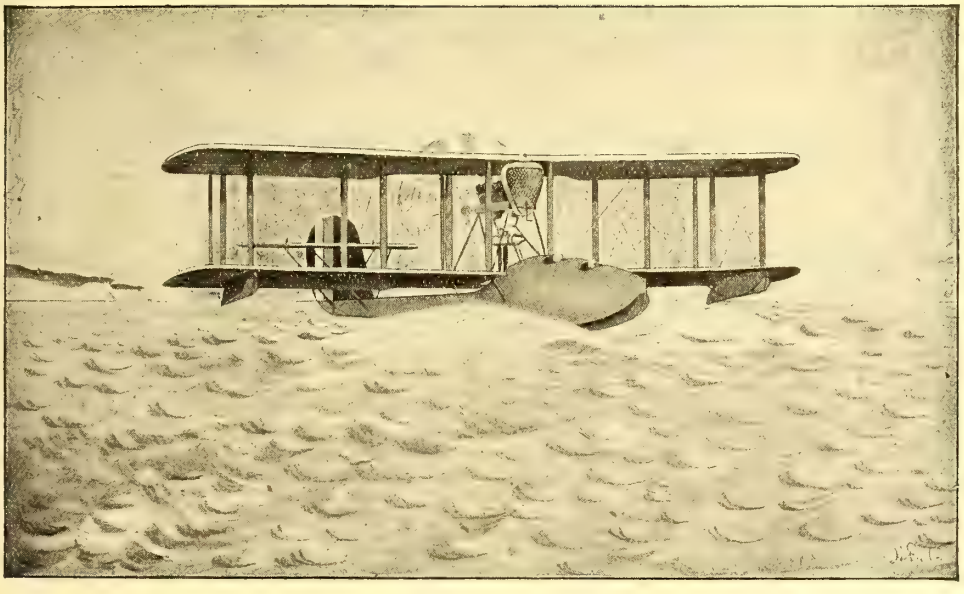
My right hon. friend has suggested that Nelson would not be a good Chief of the Staff, or Wellington. Perhaps he might have said Napoleon. I do not know what his conception of the definition of Chief of Staff really is, but I would have said that there was nobody in the Air Service who had the same eminent

A PRE-WAR FIRM.

THE NORMAN-THOMPSON FLIGHT CO., LTD.

DESIGNERS & CONSTRUCTORS OF FLYING BOATS.

ESTABLISHED 1909.



"Getting under way."

◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆

"THE FIRM WHO GAVE THE FLYING BOAT TO THE NAVY."

Works:
MIDDLETON
BOGNOR.

Bognor 48.

London Office:
DEWAR HOUSE,
HAYMARKET, S.W.1.

Gerrard 7385.

claims to that post as Sir Hugh Trenchard Something has happened which still remains undisclosed, something has happened which convinced—who? Convinced Lord Rothermere that whatever other qualifications General Trenchard might possess he was not the right man to be Chief of the Staff. It appears from an answer given to a question on April 24th that no member of the War Cabinet had seen General Trenchard in regard to the matter. We must assume that to be true.

My right hon. friend I rather gathered said it was referred to General Smuts in the first instance. General Smuts is a member of the War Cabinet, and a denial therefore that General Trenchard was seen by any member of the War Cabinet must apply to General Smuts as well as to the rest. That General Trenchard's resignation was accepted by the War Cabinet without any communication with General Trenchard himself is, I think, a regrettable proceeding, particularly as we are still in ignorance of the points of difference between General Trenchard and his superior officer.

I should have gone a good deal further in the way of criticism if, as was commonly reported, the result of this incident was going to be that the Air Service was to be deprived during the remainder of the war of General Trenchard's counsel and action in the particular department in which he was admittedly without a superior. It is a consolation, if not more than a consolation, to the House and the country to know that, at any rate, that calamity has been averted, and that in some capacity—I hope a capacity adequate to General Trenchard's abilities, and, above all, his unrivalled authority in the great Service he has done so much to build up at the War Office—we may still count on General Trenchard as an effective fighting factor in this terrible crisis of our history. But I should not be speaking my full mind, or be candid with the House, if I did not say that I regard this as a regrettable incident, and one which I wish the Government could have avoided.

The Carson Touch.

Sir E. Carson said he did not profess to know a great deal about the Air Service, nor did he feel very enlightened after the speeches which had been made as to what was the reason why General Trenchard was driven out of his appointment. He knew a distinction was drawn between resignation and dismissal, but the line was very narrow He knew this much—that a great, fierce, courageous, patriotic soldier like Sir Hugh Trenchard would never have chucked his job when a great battle approached unless he felt himself driven to it.

He did not think in all his long experience in the House he had ever known a case which had created such universal anxiety in a Service as the retirement of Sir Hugh Trenchard had in the Air Service. He knew very few of the officers of the Air Force, but he had heard in the past week or ten days a good many of them talk upon this subject—he did not suppose the Prime Minister objected to officers talking to members of Parliament—and one and all, men he had never seen before, told him the same thing, that the soul had gone out of the Air Service when Sir Hugh Trenchard had gone.

What did that mean? This was not an old Service with a large reserve of living officers. It was a young Service which could not appeal to its Nelsons, its Wellingtons, or anybody else; it was a Service almost made by Sir Hugh Trenchard—a Service in which youth, nerve, courage, trust were everything; and from what those officers told him he believed the whole of our superiority in these qualities were derived in the main from the great confidence they had in Sir Hugh Trenchard being at the head of the Air Service as Chief of Staff.

It was certainly some consolation to know that Sir Hugh Trenchard was to be retained in the Air Service, and they were grateful to the Government for it. But they would like to know what was the position General Trenchard was to have. It was now four or five months since, after the announcement of the dismissal of Sir John Jellicoe it was stated that means would shortly be taken to make use of his great ability to the Service; but the last that was heard about him was that he was hanging pictures in his private house.

What did the Government contemplate in regard to General Trenchard? It could not be some petty position. The public must be assured that the appointment was a reality, in which General Trenchard would visualise, as he had done in the past, the whole Service over which he so ably presided.

He greatly regretted that Lord Rothermere, for reasons with which they all sympathised, had to retire from his great post, and as this retirement of Sir Hugh Trenchard happened merely through disagreement with Lord Rothermere, it really would seem to be common sense that, as Lord Rothermere had gone and was no longer there to disagree with General Trenchard, the man who was so essential up to the day of sending in his resignation might again be equally essential without any friction whatever.

Our Comic Constitution.

He thought it was well that the public should know, when these dismissals arise from time to time, how exactly in our Constitution the case stood; because let this be remembered and thought about, that when a dispute arose between the civil head of a great Department of the State and his great expert, in that dispute the civil head was the judge.

If a man went to the Admiralty as First Lord and had been there only a week or a fortnight, he could dismiss at his own will his expert advisers. The public, therefore, should know that when it came to be a question whether an indispensable expert adviser or an ignorant civilian, who had only been there a fortnight, was to go, the decision rested with the civilian.

That was the constitutional position. It was a very serious one, and he thought that when those things happened it was, at least, the duty of the Government thoroughly to investigate in a case of the kind what has been the real cause of the State, in its throes, as it was at the present moment, losing a great and an efficient soldier.

The Employment of General Trenchard.

Mr. George: In response to the appeal from my two right hon. friends, perhaps I had better read the very words in which the new head of the Air Ministry refers to the employment of General Trenchard: "He is not prepared to allow the Air Force to lose the great qualities and unique experience of General Trenchard, and proposes to offer him a position in which those qualities and experience will find an outlet of the greatest value to the Force. He asks that the House will not press for a definition of the position at the present time, and asks me to say that it is not proposed to create one, but to give him one directly associated with his own aerial policy."

Sir J. Simon said that having had close, personal, daily knowledge of the young men in the various squadrons in France, he thought it no exaggeration to say that the news of General Trenchard's resignation had struck those young men as an almost deadly blow. They wholly failed to understand it. If they wanted those young men to laugh they had only to try to make them believe that Sir H. Trenchard did not understand staff work.

They all knew the work he had done. Nor could it be gainsaid that there was not a single development of aircraft at the front in which you could not trace the active imagination and organisation of this distinguished soldier. Low flying, which did so much in the battle of Cambrai, and which saved the British Army was anticipated and worked out and organised by General Trenchard in the last year or two. The same was true of photographic reconnaissances and bombing of all sorts to which machines were being put, and it was the height of absurdity to speak of him as a person who had merely the qualities of leadership.

He had never heard in any quarter at any time from any Army officer of any rank any other verdict than that the manner in which the general had practically adjusted the differences between the two branches of the Service had won the admiration of every one of them.

When General Trenchard left the command in France to come over here at Lord Rothermere's own invitation in order to accept the post Lord Rothermere assigned to him, he wrote a letter to the French Flying Corps, and the distinguished general in command of that corps made the letter an order of the day. There was not an American in the Flying Corps who would not tell them that in organisation and in tact General Trenchard exhibited his great qualities.

What had made the real gravity of the situation was that when the British line was being driven back they were putting a strain on the squadrons of the Flying Corps which no one who had not seen it could properly describe. Airmen were giving up their aerodromes, they might have to burn their stores, they were flying all day and possibly coming back at night, and having to take their machines down in an open field. In these circumstances they depended on that steady confidence which only came from being sure that they were being wisely led by the man in whom they were placing their trust. Surely it was a terrible disaster that in the middle of this great battle such a distinguished soldier felt it his duty to offer his resignation.

[As a matter of fact, General Trenchard tendered his resignation before the battle began. He did his work during the battle. And he was turned out *by the Cabinet* at the most critical moment.—Ed.]

Mr. Joynson-Hicks said he was in a position to know the feeling of young men in the Air Service at the front and everything that had been said with regard to the absolute disaster of General Trenchard's resignation was correct. The enthusiasm of these young men had been inspired by General Trenchard and their devotion and willingness to die were the result of his teaching and training. In fairness it must be said that General Salmond, who had succeeded General Trenchard at the head of the Force in France, was a magnificent officer. If a new position were offered to General Trenchard which afforded him scope for his unrivalled talent, he was certain that in the interests of the country General Trenchard would forgive all that was past and accept the post.

He felt General Trenchard must be saved for the Flying Corps. If General Trenchard was not to be Chief of the General Staff he knew of no better man than General Sykes to fill that post. He suggested that the training of the Air Service here needed a strong hand, and that the Government could not do better than to hand over the management of the young pilots to General

MANN EGERTON & Co.Ltd.

CONTRACTORS TO H.M. ADMIRALTY,
WAR OFFICE AND AIR MINISTRY.

Designers and Manufacturers of Proved Efficiency of all Types of AIRCRAFT

HEAD OFFICE AND WORKS

AIRCRAFT WORKS, NORWICH

SPECIAL DEPARTMENT
for the manufacture of
AIRCRAFT ACCESSORIES
(Strainers, Bolts and Nuts, etc., etc.)
177, CLEVELAND ST., LONDON, W.1.

MANN EGERTON & Co.Ltd.

LONDON NORWICH IPSWICH BURY ST. EDMUNDS.

Trenchard, who would instil into them the spirit of high devotion to duty.

Colonel McCalmont endorsed the suggestion that General Trenchard might be made responsible for the discipline, training, and recreation of young pilots.

[A perfectly futile suggestion. Sir Hugh Trenchard is a great soldier, not a schoolmaster.—Ed.]

Mr. Harcourt did not think the Prime Minister had made it clear that General Trenchard's successor was appointed not on a general consideration of the case as between two officers, but as being the best officer available after General Trenchard had resigned.

Brig.-Gen. Page Croft said that the Prime Minister had said that General Trenchard, for reasons of chivalry, did not wish to displace another officer. That point ought not to weigh with the Government. If Sir H. Trenchard were the best man for the position, no question of etiquette or chivalry should prevent the Government reinstating him in his former office, even though they admitted the splendid qualities of his successor.

Sir W. Essex asked why it was, when the Air Force was formed, that Sir W. Weir was passed over, first for one and then for another, and that other a journalist and a member of a family that, some of them thought, had had too much influence in the government of this country. He asked how many resignations from the Air Force had been offered within the last six months, and did the list include the name of the Parliamentary Secretary of the Ministry himself?

Mr. Billing said that if the debate did no more than make the position of a member of Parliament on any Staff or in any regiment impossible it would have accomplished much. The solution of the difficulty lay in the placing of General Trenchard in supreme command of the military side of the Air Service in France. He was exceedingly sorry for the resignation of Lord Rothermere who had made the strongest effort to knock the non-military side of the Service into some sort of proper condition. The Hotel Cecil contained many able men, but it was crammed full of useless officers doing absolutely useless work.

Major Baird (Parliamentary Secretary to the Air Board): That is a calumny on a great many officers who are doing absolutely indispensable work.

[Such as Major Baird?—Ed.]

Major Baird said the House would appreciate a letter which General Salmond, the officer in command, wrote to General Trenchard on April 6th, that was after the German offensive had been continuing for about a fortnight. General Salmond wrote:—"I wish you would express to the President and members of the Air Council and all concerned my thanks, and those of all serving with me, for the wonderful promptness with which all our heavy demands have been met to the full. It has helped us to keep going on, and the knowledge that we are so strongly backed from home gives us the utmost confidence in the future."

He hoped that would dispel from the minds of hon. members the ideas which the hon. member for Hertford had suggested. Anything more scandalous than that a man who had no knowledge of what he was talking about should accuse hard-working and efficient officers and officials of laziness and idleness when such testimony was paid to their work he could not conceive, and was to his mind a disgraceful thing for a member of this House to do. He was glad to have the opportunity of giving him the lie direct.

Sir W. Essex: Is the hon. member entitled to give the lie direct? Is that a Parliamentary expression?

The Chairman: It is not the Parliamentary way of expressing the hon. and gallant member's opinion.

Major Baird: If I used an unparliamentary expression I meant that what the hon. member said was completely and wholly inacurate. This work, he continued, had been carried out by the officers and officials of the Royal Flying Corps and the Royal Naval Air Service at the time they were amalgamating the two Forces, so that not only had they been able to meet all demands—and tremendous they were—that had been sent from the front, but they had been able to carry out the amalgamation of the two Services with the minimum of error.

There was an interesting figure showing in the most conclusive manner the growth in our superiority over the enemy in the air. Our losses in the air during March—that was, killed, wounded, missing, and prisoners—were almost the same as the losses we suffered in the air from all causes in April of last year. In April last year we were engaged in winning supremacy in the air in the battle o fthe Somme; in March, this year, we were engaged in the present tremendous battle, and, whereas our losses from all causes were practically the same in both months, the number of German machines distinctly ascertained to be destroyed—that was, seen to crash—were three and a half times as many this year as last.

Though everything was not perfect, he believed the Air Force was progressing upon sound lines and had complete and absolute confidence in its Secretary of State. The Secretary of State had asked him to say that he hoped, as soon as he had got into the saddle, that hon. members would give him an opportunity of meeting them in one of the committee-rooms upstairs, when he would be able to explain his position and policy as clearly as if he were a member of the House.

The vote was then agreed to, and other votes relating to the Air Force were afterwards agreed to without discussion.

R.A.F. AFFAIRS IN THE HOUSE.

On April 24th **Major Sir John Simon** (Walthamstow, L.), asked the Prime Minister on what date Major-General Sir Hugh Trenchard tendered his resignation, and on what date the matter came before the War Cabinet and the resignation was accepted.

Brigadier-General McCalmont (Antrim, E., U.): Before the right hon. gentleman replies, will he say whether it has not always been the custom for hon. members who hold commissions to refrain from making use of confidential information which reaches them in the course of their duties in putting questions or in taking part in debates which affect the conduct of their superiors, and whether he expects the practice to be continued in view of the questions on the paper?

The Chancellor of the Exchequer (Mr. Bonar Law) (Bootle, U.)—That raises a very large question on which I do not think I should be asked to give a decision now. In the meantime, I think it must be left to the good sense and good feeling of the members in question. Sir Hugh Trenchard tendered his resignation on March 19th to the Secretary of State for the Royal Air Force, who on April 10th and 12th brought the matter before the War Cabinet. The Secretary of State intimated on April 12th to Major-General Sir Hugh Trenchard that he had accepted his resignation.

Sir E. Carson (Dublin University, U.), asked whether the Secretary of State had power to accept the resignation without going to the War Cabinet.

The Chancellor of the Exchequer: Certainly.

Major Sir John Simon asked whether, between the date when General Trenchard's resignation was tendered and the date when it was accepted, the War Cabinet or any member of it ever saw General Trenchard on the subject and discussed with him the difficulties of his position.

The Chancellor of the Exchequer: The answer is in the negative.

Major Baird, Parliamentary Secretary to the Air Board (Rugby, U.), replying to **Sir F. Blake** (Berwick, L.), said that after tendering his resignation Major-General Sir H. Trenchard continued his work temporarily upon being requested to do so. As to whether he was consulted before the fact of his resignation was made public, the answer was in the negative.

On April 25th **Sir E. Carson** asked whether it was true that the Secretary of State for the Air Service had resigned, and whether any successor had been appointed.

The Chancellor of the Exchequer: It is true, I regret to say that Lord Rothermere has resigned, and his successor has not yet been appointed.

Mr. Pringle: Has Lord Northcliffe resigned his post on the American Mission and the Ministry of Information? (Laughter.

The Chancellor of the Exchequer: I have received no information to that effect, and have no reason to anticipate it.

Mr. Hogge: Is there any later news about Lord Beaverbrook? (Laughter.)

Lieut. the Lord H. Cecil: Will it be a convenient course to discuss the Air Service Vote while there is no Secretary of State in office, or would it not be more convenient to put the discussion off?

The Chancellor of the Exchequer: That must be a question to be decided by those who desire to discuss it, and not for the Government. If my noble friend wishes to postpone it the Government is quite willing.

Mr. Pringle: Is not this a decision of the War Cabinet? Must not we consider the position of General Trenchard?

The Chancellor of the Exchequer: The hon. gentleman speaks as if we were desiring to postpone the discussion, but we desire nothing of the kind.

THE ENLISTMENT OF R.A.F. CADETS.

The Secretary of the Air Ministry states that complaints have been made that R.A.F. cadets from various districts are obliged to travel to London for medical examination. Arrangements have now been made for the examination of all candidates at the centre in Arkwright Road, Hampstead, before they are drafted to cadet wings or schools of aeronautics.

A depot has been established at Hampstead to which all candidates are sent for their medical examination and subsequent attestation,, vaccination, and so on. The medical examination will be carried out, as before, by the Aviation Candidates Medical Board, which consists largely of experienced and expert medical officers, and has been enlarged and strengthened to meet the needs of the service. No candidate will in future be sent to a cadet wing or training school until he has been examined by this board and pronounced fit for aviation.


FOR OBSERVATION PANELS
FOR WINDSCREENS
FOR GOGGLES
FOR MAP COVERS
NOTHING EQUALS:—
'TRIPLEX' SAFETY GLASS
"Triplex" gives 100% visibility, and is absolutely safe; cannot 'fly' or splinter. It has been the means of saving the sight of numerous pilots and observers.
The "TRIPLEX" SAFETY GLASS Co., Ltd.
(REGINALD DELPECH, Managing Director),
1, Albemarle St., Piccadilly, London, W.1.
Telephone—Regent 1340.
Telegrams—"Shatterlys, Piccy, London."

AIR MINISTRY REPORTS.

The Air Ministry issued on April 27th the following comparative statement of the number of bombs dropped by British aircraft in France over the enemy's lines opposite our front and of those dropped by the enemy in the area occupied by British troops during March :—

	British.		Enemy.
(1) By Day	23,099	.....	517
(2) By Night	13,080	.....	1,948
Total	36,179	.....	2,465

TRANSFER TO THE AIR FORCE.

An Army Council instruction has been issued dealing with the procedure with regard to officers and ex-officers who desire to transfer to the Royal Air Force as flying officers.

An officer serving with a unit at home who wishes to transfer will apply personally and with the written consent of his commanding officer to the nearest R.A.F. Reception Depôt.

An officer serving with an Expeditionary Force in Europe will apply through his commanding officer.

An officer serving in the Middle East or India will be entirely dealt with in Egypt or India.

An officer who is at home but not on the strength of a unit at home or abroad will apply in the first instance to the Officer Commanding London Reception Depôt, R.A.F., 40, Upper Brook Street, W., and will not require a letter from a commanding officer.

An officer who is at home but whose unit is abroad may, if he can produce the written consent of his commanding officer, apply in a similar manner.

THE ATTACK ON THE BELGIAN COAST.

Though aircraft were not apparently used in the attack on Ostend and Zeebrugge on April 23rd, there have been several references to the effect or non-effect of air work in the various reports. The following appears to cover the situation :—

The official announcement in Parliament says :—"At Ostend the two block ships were run ashore and abandoned after being blown up. It is too early yet to say definitely whether they have accomplished their objective or not. It was too misty for aerial observation, but reports from officers concerned are to the effect that, so far as they could see in the dark, they were slightly off their course."

The "Daily Express" understands that the officer who developed the scheme for the use of fog and smoke in connection with the attack was Acting-Wing Commander Frank A. Brock, O.B.E., R.N. Sir Eric Geddes stated that he was killed.

Sir Eric Geddes, in his announcement in the House of Commons, said that one of the objectives of the raid was the large seaplane base on the Mole of Zeebrugge.

The following extracts are taken from an account of the raid on Zeebrugge, which appeared in the "Times" on April 26th.

Photographs taken by our flying men show that two of the block ships are in the mouth of the Bruges Canal, well inside the shore line, and lying diagonally across the channel. The third is outside the canal mouth, blocking the greater part of the channel across the harbour.

As already announced by the Admiralty photographs reveal a clean break in the viaduct at the landward end of the Mole. They also show, I learn, that the Germans have tried to bridge the gap by planking.

AMERICAN AIRCRAFT PRODUCTION.

A message from Washington, dated April 24th, states that Mr John D. Ryan, the copper magnate, has been appointed Director of Aircraft Production under the scheme of reorganisation recently announced. An Aeronautics Division has been created under Brigadier-General William Kenly Yeading.

The Aircraft Board remains in an advisory capacity with Mr. Ryan as Chairman, in succession to Mr. Howard Coffin, who resigned.

The "Times" correspondent writes on April 25th from Washington that Mr. John D. Ryan, of Montana, who has been appointed Director of Aircraft Production will have powers and responsibilities similar to those conferred upon Mr. Schwab in regard to shipping. Mr. Ryan, who was born in Ireland, is a self-made man, and stands second only to Mr. James J. Hill among the men who have made the great North-West what it is to-day. He is pre-eminent as an industrial organiser, and was once described as a man who had "foresight, hindsight, and carsight."

General Squier, it is officially announced, will devote his attention to signals—in other words, will look after field telegraphs, telephones, and wireless stations. A division of military aeronautics is created for training pilots.

Under the new system, once the Army experts have decided on the types and quantities of aeroplanes they need, they will place their orders with Mr. Ryan, who will produce the machines. The Navy aircraft programme is not affected by Mr. Ryan's appointment, as the Navy is now ahead of schedule in the manufacture of seaplanes with Liberty engines which are said to be giving most excellent results.

THE DEATH OF MANFRED von RICHTHOFEN

It is now possible to give some particulars concerning the death of Rittmeister Freiherr Manfred von Richthofen, whose death was recorded last week.

The following obituary notice has been issued by the Commanding General of the German Air Forces, General von Höppner :—

"Rittmeister Freiherr von Richthofen has not returned from pursuit of the enemy. He has fallen. The army has lost its generally admired hero, the Chasers their irresistible and beloved leader. He remains the hero of the German people, for whom he fought and died. His death is a deep wound for his squadron and for the entire Flying Service. The will by which he conquered and led, and which he handed down, will heal the wound."

It appears that on the morning of his death the following order was transmitted by the Group Commander of Aviation concerned to the "First Pursuit Squadron," which Capt. von Richthofen commanded :—

"It is not possible to fly over the Ancre in a westerly direction on account of strong enemy opposition. I request that the aerial barrage be forced back in order that a reconnaissance up to the line Marieux-Puchevillers (10 miles behind the front) may be carried out."

As a result the squadron appeared over the British lines between the Ancre and the Somme, not far from Corbie, at about 11 a.m. on April 21st, and attacked two British aeroplanes, said to have been manned by Australians. Various British aeroplanes flew to their rescue, and what is known as a "dog-fight," or general mix-up engagement, ensued.

Von Richthofen headed a British machine out of the fight, and was pursued in turn by another British aeroplane.

The trio worked about two miles away from the general engagement, descending steeply until they were within a hundred feet or so of the British trenches.

Suddenly von Richthofen's machine, which was a Fokker triplane, dived vertically into the ground and broke up completely.

Infantry left the trenches at considerable risk, and rescued his body, despite a barrage put up by the enemy.

Considerable doubt exists as to whether he was hit by machine gun from another aeroplane or from the ground, though one account says that the course of the bullet through his chest, travelling in a horizontal direction from left to right, would rather suggest that it came from an aeroplane.

The Assistant Official correspondent with the Australian Force says that the bullet was probably fired by a Lewis gunner attached to a battery of Australian Field Artillery, but is quite willing to admit the possibility of the claim of a British aviator.

The German official view on this subject was as follows :—

"According to the unanimous declarations of those accompanying him, and the observations of various spectators on the ground, Rittmeister von Richthofen pursued an enemy fighting aeroplane to the ground. He was at a low altitude, when apparently a defect in the motor forced him to land behind the enemy lines. As the landing was effected without mishap it where was hope that Capt. von Richthofen was captured unhurt.

"Reuter's report of April 23rd, however, no longer leaves any doubt that Rittmeister von Richthofen met his death. Since Rittmeister von Richthofen was the pursuer, he cannot well have been hit by his opponent in the air; he appears rather to have fallen a victim to a chance hit from the ground."

The Fokker triplane which Rittmeister von Richthofen was flying was painted red, and bore the number 2009. The motor was an imitation Le Rhone motor, built at the Oberursel Factory, Frankfort, and bore the date March, 1918.

The armament of the machine was two synchronised Spandau machine guns.

The funeral, which took place on the following day, must have been a very impressive ceremony. There were many wreaths on the coffin, one of which bore the inscription : "A valiant and worthy foe."

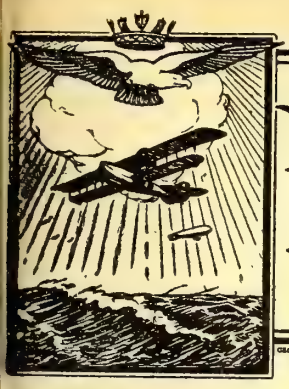
Six officers of the Royal Flying Corps acted as bearers. The procession passed slowly along the country road, saluted by hundreds of soldiers.

An Army chaplain read the English burial service at the grave which was made under a great hemlock tree just inside the cemetery gate. Officers, air mechanics, pilots who had met the dead aviator in battle, and French civilians listened to the words of committal.

A firing party paid him the last tribute of his enemies, and British aeroplanes circled overhead. So passed the greatest of our aerial foes to his last rest.

A NEW HUN TYPE.

It was reported from Paris on April 17th that a new German aeroplane has made its appearance at the front. It is the Pfalz D3, and is a one-seater chasing machine. Very small and less than 10 metres (32.8 ft.) in its spread, it reminds one of the Albatros, but does not seem capable of considerable ascension speed. Two Pfalz machines have already been brought down one by a French and the other by an American aviator.



NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

Admiralty, April 22nd.

R.N.A.S.—Probv. Flt. Comdr. to be Flt. Comdr. :—J. H. d'Albiac, D.S.O., March 27th.

Flt. Obsr. to be Flt. Comdr. :—R. W. Gow, D.S.O., D.S.C., Dec. 31st, 1917.

War Office, April 23rd

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld. :—Temp. Lt. J. P. Colin, Gen. List, Dec. 18th, 1917; Temp. Sec. Lt. J. S. Green, M.C., Gen. List, Jan. 9th; Lt. A. L. Chick, Essex R., T.F.; Temp. Sec. Lt. A. F. Woodward-Gregory, Gen. List, March 30th; Temp. Sec. Lt. H. Liver, Gen. List, March 31st.

Special Appt.—Graded as a Flt. Comdr.—The appt. of Lt. E. N. Grimble, Herts R., T.F., notified in the "Gazette" of Jan. 28th, is cancelled.

Adjts.—Lt. D. G. Nairn, A.S.C., T.F., to be secd., and to be temp. Capt. (without the pay and allces. of that rank) while so empld., Feb. 7th; Lt. (temp. Capt.) W. Benn, D.S.O., Yeo., T.F., from a Flying Officer (Observer), and to retain his temp. rank, with pay and allces. as Lt., March 30th.

Balloon Co. Comdr. (Graded as a Flt. Comdr.).—Lt. E. G. N. Grimble, Herts R., T.F., from a Balloon Comdr.) (graded as a Balloon Officer), and to be temp. Capt. while so empld., Dec. 11th, 1917.

Depôt Comdrs.—And to be temp. Lt.-Cols. while so empld.—Temp. Maj. S. Janson, A.S.C., from an Equipt. Officer, 1st Cl., Feb. 7th; Temp. Maj. R. F. Stapleton-Cotton, Gen. List, from Special Appt. (graded as a Park Comdr.), March 25th.

Special Appts. (Graded as Park Comdrs.).—And to be temp. Majs. while so empld.—Temp. Capt. C. H. D. Bonnett, Gen. List, from a Special Appt. (graded as Equipt. Officer, 1st Cl.), March 10th; Temp. Capt. J. H. S. Annesley, Gen. List, from an Adjt.; Capt. G. H. Errington, N. Staff. R., Spec. Res., from an Adjt., March 12th.

Gen. List.—The follg. from R.F.C., to be temp. Sec. Lts.—Ord Cl. Air Mechs.—J. L. Kirby, Dec. 29th, 1917; A. MacBean, L. V. Quick, Dec. 31st, 1917; A. G. Willcox, Jan. 6th; E. Rose, Jan. 11th.

Memorandum.—Temp. Serjt.-Maj. W. L. Rennie, from R.F.C., to be Sec. Lt., while serving with R.F.C., March 30th

* * *

With reference to the awards conferred as announced in the London Gazette," dated Dec. 17th, 1917, the following are the statements of service for which the decorations were conferred :—

The Distinguished Service Order.

Spec. Lt. R. C. Steele, R.F.C., Spec. Res.

He has done consistent good work in aerial fighting during eight months. On one occasion he brought down within our lines an enemy scout of the latest type, and, landing alongside it, made the enemy pilot a prisoner before he could destroy his machine.

A Bar to the Military Cross.

Temp. Sec. Lt. M. B. Frew, M.C., Gen. List and R.F.C.

For conspicuous gallantry and devotion to duty in shooting down three enemy machines in two days. He has destroyed eight enemy machines and driven down many others out of control.

Lt. R. A. Maybery, M.C., Lrs. and R.F.C.

For conspicuous gallantry and devotion to duty as leader of offensive patrols for three months, during which he personally destroyed nine enemy aeroplanes and drove down three out of control. On one occasion, having lost his patrol, he attacked a formation of eight enemy aeroplanes. One was seen to crash, and two others went down out of control, the formation being completely broken up.

Temp. Sec. Lt. L. A. Powell, M.C., Gen. List and R.F.C.

Since his name was last brought to notice he has destroyed eight hostile machines. On one occasion, with his pilot, he engaged 11 enemy aeroplanes, his pilot bringing down one. On another six Albatros scouts and two two-seaters were encountered, two being brought down and three others engaged with indecisive results.

The Military Cross.

Lt. (temp. Capt.) J. M. Burd, R.F.A. and R.F.C.

For conspicuous gallantry and devotion to duty as a leader of long-distance bomb-raids. When returning from a raid he attacked 10 enemy aeroplanes, which were engaged with another of our formations. He shot down two and his observer another, and he then brought his formation back without loss. In six raids he only lost one machine. He has been leader in 17 operations and deputy leader in 11.

Lt. E. D. Clarke, R.F.C., Spec. Res.

He has shot down five enemy machines. In an attack he repeatedly dived to within 50ft. of the enemy infantry, firing 500 and 600 rounds. Though struck by a piece of shell, which wounded him in both arms and shattered both petrol tanks, he succeeded in gliding back behind our lines

Temp. Sec. Lt. W. Durrand, Gen. List and R.F.C.

As a patrol leader he is dashing and determined. He has shot down seven enemy machines.

Temp. Capt. H. O. W. Hill, R.F.C.

He carried out artillery observations on a hostile battery for three and-a-half hours, subjected most of the time to heavy anti-aircraft and machine-gun fire. Nevertheless, he directed the shooting most successfully. He has attacked hostile aircraft on 23 occasions and driven them off; in one of these attacks he succeeded in driving off five enemy aeroplanes, although his observer was wounded. He has shown great skill.

Sec. Lt. D'A. F. Hilton, R.F.C., Spec. Res

For conspicuous gallantry and devotion to duty in attacking enemy aircraft and engaging troops on the ground. While on patrol he attacked single-handed six two-seater machines, forcing one down and driving the rest back. He has driven down five other machines.

Sec. Lt. H. H. Maddocks, Gen. List and R.F.C.

Whilst attacking two hostile aeroplanes he saw an enemy machine attacking one of his patrol. He at once attacked the enemy machine, which was seen to crash. On one occasion during a fight between seven enemy machines and a patrol of our scouts, he engaged one of the enemy machines, causing it to drop from 6,000 ft. to 1,000 ft., where it caught fire and dived vertically down. On two other occasions he drove down an enemy machine after a short fight. He has done consistent and continual good work.

Capt. J. J. L. Williams, Yeo., attd. R.F.C.

He shot down three hostile aeroplanes in a very short period, showing great initiative and fearlessness on all occasions.

Air Ministry, April 23rd.

R. A. Force.—The following appointments are made at the Air Ministry :—

Deputy Chief of the Air Staff.—Lt.-Col. (temp. Brig.-Gen.) R. M. Groves, D.S.O., and to retain his temp. rank while so empld., April 17th.

Medical Administrator.—Maj.-Gen. R. C. Munday, March 5th.

Assistant Medical Administrator.—Lt.-Col. C. B. Heald, April 1st.

Staff Officer 3.—Capt. E. V. King-Hall, April 1st; Lt. (temp. Capt.) C. K. Jupp, April 1st; Capt. Hon. R. G. Winn, April 8th.

E. B. Ashmore, C.M.G., M.V.O. (Bt. Col., temp. Maj.-Gen. in Army), is granted a temp. commn. as Maj.-Gen., April 19th.

Flying Branch.—Lts. to be temp. Capts. while empld. :—Capts. (Flying) :—D. R. Maclaren, April 6th; W. L. Harrison, April 7th; J. W. Aldred, M.C., April 15th.

Administrative Branch.—Capt. E. H. C. Bald, M.C., to be temp. Maj. whilst specially empld., April 10th.

Lt. (Hon. Capt.) H. C. Waghorn to be temp. Capt. while empld. as Admin. Capt., April 3rd.

Lt. C. A. Pelham to be temp. Capt. while empld. as A.D.C., April 10th

The following are granted temp. commns. as Capts. while empld. as Courts-martial Officers :—M. B. O'Brien (Capt., Lond. R., T.F.), April 4th; S. S. Macaskie (Capt., Lond. Yeo., T.F.), April 5th.

Lt. H. C. G. Allen to be temp. Capt. (without the pay and allowances of that rank) while empld. at the Air Ministry, April 13th.

The following relinquish their commns. on ceasing to be empld :—Temp. Lt.-Col. F. R. Hedges, April 7th; Lt. R. D. Sampson, April 9th; Lt. E. B. H. Johnson (R.F.A., Spec. Res.), April 24th.

Sec. Lt. P. J. Webb relinquishes his commn. on account of ill-health, April 24th.

Technical Branch.—Lt. H. Cooke-Smith to be temp. Capt. while empld. as a tech. Capt., April 9th.

Sec. Lt. (temp. Lt.) W. S. Renwick to be Lt. whilst empld. as a temp. Lt., April 4th.

War Office, April 24th.

REGULAR FORCES.—Staff.—Special Appointments.—Graded for purposes of pay as a Brig. Maj. while empld. as Asst. Comdt., R.F.C., Cadet Wing.—Capt. A. Gallaher, D.S.O., D. Gds., to be secd., and to be temp. Maj. while so empld., March 15th.

Establishments.—R.F.C.—Mil. Wing.—The following appts. are made :—

Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld. :—Temp. Sec. Lt. D. A. Stewart, Gen. List, March 25th. Lt. J. T. Quick, Devon R., T.F., March 29th.

School of Instrn.—Central Flying School.—Instrs.—Temp. Capt. A. W. Keen, M.C., Gen. List, a Flt. Comdr., vice temp. Lt. (temp. Capt.) H. M. Sison, M.C., A.S.C., Nov. 30th, 1917. Lt. (temp. Capt.) H. A. Wood, M.C., Spec. Res., a Flt. Comdr., vice Capt. (temp. Maj.) A. C. Clarke, Welsh R., Dec. 27th, 1917. Sec. Lt. (temp. Capt.) W. R. S. Wilberforce, M.C., K.R. Rif. C., a Flt. Comdr., vice temp. Capt. (Sec. Lt., Res. of Officers) Lord G. H. L. Dundas, Gen. List, Jan. 3rd. Lt. (temp. Capt.) K. L. Caldwell, M.C., Spec. Res., a Flt. Comdr., vice Capt. C. M. Crowe, M.C., Spec. Res., Feb. 21st. Lt. (temp. Capt.) G. L. Lloyd, M.C., Yeo., T.F., a Flt. Comdr., vice Lt. (temp. Capt.) H. A. Wood, M.C., Spec. Res., March 2nd. Lt. (temp. Capt.) R. S. Lucy, Worc. R., T.F., a Flt. Comdr., vice Lt. (temp. Capt.) K. L. Caldwell, M.C., Spec. Res., March 18th.

Gen. List.—Capt. H. W. Stockdale, S. Afr. Def. Force, to be temp. Capt., Sept. 4th, 1917. To be temp. Sec. Lt. :—1st Cl. Air Mech. S. A. Odell, from R.F.C., March 23rd.

Memoranda.—To be temp. Maj.-Gen. :—Col. (temp. Brig.-Gen.) D. E. Cayley, C.M.G., Worc. R., March 12th.

Maj. A. M. Grenfell, D.S.O., Yeo., T.F., from a Spec. Appt. (graded for purposes of pay as a Brig.-Maj.), to be temp. Lt.-Col. while empld. as Comdt., R.F.C., Cdt. Wing, March 15th.

War Office, April 25th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.—Temp. Sec. Lt. J. A. Pattern, Gen. List, Dec. 23rd, 1917. Sec. Lt. R. H. Martin, R. Muns. Fus., and to be secd., March 20th.

Special Appts.—Graded as Park Comdrs.—March 9th :—Temp. Lt. (temp. Lt.-Col.) G. R. Moser Arg. and Suthd. Highrs., on relinquishing the appt. of Comdt. (graded as a Depot Comdr.), Schools of Aerial Gunnery, and to revert to the rank of temp. Maj. while so empld.; temp. Sec. Lt. (temp. Lt.-Col.) A. R. C. Cooper, Gen. List, on relinquishing the appt. of Comdt. (graded as a Wing Comdr.), Schools of Aerial Gunnery, and to revert to the rank of temp. Maj. while so empld.

Gen. List.—The notification in the "Gazette" of April 8th, 1918, regarding temp. Sec. Lt. (temp. Capt.) F. J. Wood is cancelled.

1st Cl. Air Mech. E. A. Gay, from R.F.C., to be temp. Sec. Lt., March 23rd.

* * *

With reference to the awards conferred, as announced in the "London Gazette," dated Jan. 18th, 1918, the following are the statements of service for which the decorations were conferred :—

The Military Cross.

Lt. (Temp. Capt.) B. P. G. Beanlands, Hamp. R. and R.F.C.
He has brought down three enemy aeroplanes out of control and driven down several others over the enemy lines.

Temp. Sec. Lt. R. R. Bentley, Gen. List and R.F.C.
When information was urgently required during an attack and several attempts to obtain it had been unsuccessful owing to exceptionally bad weather conditions, he went out and succeeded in gaining the necessary information, flying at a height of about 50 feet under heavy rifle and machine-gun fire. He had already made a flight under similar conditions on the same day. His pluck and determination were a fine example to his squadron.

Temp. Lt. P. T. Carden, Gen. List and R.F.C.
When acting as observer he made a successful wire reconnaissance along a corps front at a height of 300 to 800 ft. under heavy machine-gun and rifle fire. On another occasion while observing during a reconnoitring patrol, he and his pilot had four encounters with enemy aeroplanes, in one of which they were attacked at 8ooft. by five enemy scouts. He kept up a continuous fire, and drove off the enemy, and completed a valuable reconnaissance. He showed the greatest keenness and determination at his work.

Lt. (Temp. Capt.) R. M. Charley, R.F.C., Spec. Res.
He attacked a hostile balloon which was eventually brought down in flames. With four other pilots he attacked eight enemy scouts and drove two down. He has driven down four other enemy aircraft, usually fighting with his patrol against greatly superior numbers.

Sec. Lt. C. G. Fenton, R.F.C., Spec. Res.
In spite of frequent thunderstorms, and the use of smoke screens by the enemy, he ranged a battery on a hostile battery position, obtaining eight good hits, destroying two gun-pits and causing a large explosion. He afterwards ranged them on to another battery, destroying a gun-pit, obtained three direct hits on a farm full of troops, and then silenced four batteries. On at least two other occasions he ranged the battery with remarkable success.

Sec. Lt. H. Hammond, Dorset R. and R.F.C.
Having successfully bombed a station behind the enemy lines he was wounded in the arm and fainted. On recovering he again took control, but shortly afterwards lost consciousness once more. His coolness and courage in spite of pain and loss of blood were remarkable. On several occasions he had bombed and derailed trains, and destroyed hangars at hostile aerodromes. He invariably set a fine example of courage and skill.

Lt. (temp. Capt.) H. Hewett, R. Berks R. and R.F.C.
For conspicuous gallantry and devotion to duty when co-operating with heavy artillery. He performed gallant and valuable work, which resulted in the partial destruction of an enemy railway bridge.

Lt. F. H. Holmes, R.E. and R.F.C.
He observed for 37 destructive counter-battery shoots, and shot down two enemy aeroplanes which attacked him.

Temp. Sec. Lt. H. Howard, attd. Northd. Fus. and R.F.C.
As observer, having successfully bombed a station behind the enemy lines, he took control of the machine on his pilot fainting from a bullet wound in his arm. He managed to keep the machine level and flew it until his pilot recovered. Shortly afterwards the latter again lost consciousness, and this officer took the control once more, managing to land the machine under very difficult circumstances well behind our lines. This officer has always shown a fine example of courage and skill in the many night bombing raids in which he has taken part.

Lt. G. R. Hunter, Camn. Highrs. and R.F.C.
After completing four successful bombardment shoots in one flight, giving 96 observations, he was attacked by seven enemy aeroplanes, but drove them off. On another occasion, though attacked by four enemy aeroplanes, he obtained the information he desired, and rendered his report.

Lt. (temp. Capt.) C. T. Lally, R.F.C., Spec. Res.
For conspicuous gallantry and devotion to duty in many bomb raids and photographic and long-distance reconnaissances, many of which he has led most successfully. He has taken part in numerous combats, and has destroyed three hostile positions. When ordered to bomb a position he spent 1½ hours looking for it, then returned for more petrol, and at the second attempt dropped a bomb on it, and with another set a dump on fire, under most difficult weather conditions.

Lt. A. Mann, A.S.C. and R.F.C.
He successfully took photographs though attacked by several enemy aeroplanes, one of which he drove down. On another occasion, though attacked by four Albatros scouts, and driven down from 9,500 ft. to 4,000 ft., he drove off the enemy and completed his task.

Lt. (temp. Capt.) C. E. H. Medhurst, R. Innis. Fus. and R.F.C.
He successfully bombed from a low altitude hostile batteries which were in action, and silenced their fire.

Sec. Lt. P. J. Moloney, R.F.C., Spec. Res.
When on patrol he was attacked by six hostile aeroplanes which dived at him out of the clouds. In the first burst of fire he received a severe wound, his control wires were very badly cut, and several of his flying wires were shot away. Despite this he attacked four of the enemy aeroplanes, one of which disappeared, another crashing down out of control. Feeling very faint from loss of blood he then made for our lines through the nearest clouds. Though the fog was very thick he succeeded in landing his machine undamaged behind our lines. On another occasion, when on patrol, he engaged the leader of a hostile formation, and drove him down. Though he suffered from engine trouble, he finally succeeded in driving off another enemy scout which had attacked him. This officer's tenacity and pluck are worthy of the highest praise.

(*Continued on page* 1641.)

TRADE MARK

ASCOL

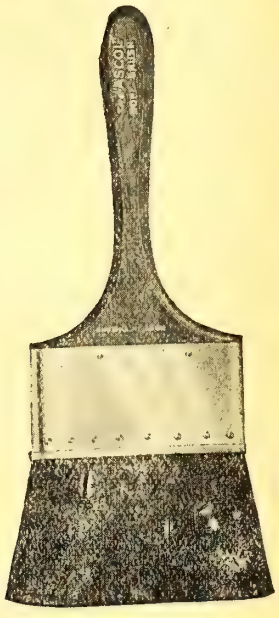
REGISTERED.

WHEN A FIRM sells an article branded with its own definite and distinctive trade-mark, you can depend upon that article being up to the highest standard. No firm would care to link up its individuality with inferior goods.

The specialities illustrated in this announcement are well worthy of the brand they bear—and the brand "Ascol" is sufficient testimony to the quality, reliability of each and every one.



FACTORY STOOLS
(Wood).
24in. high - 6/6 each.



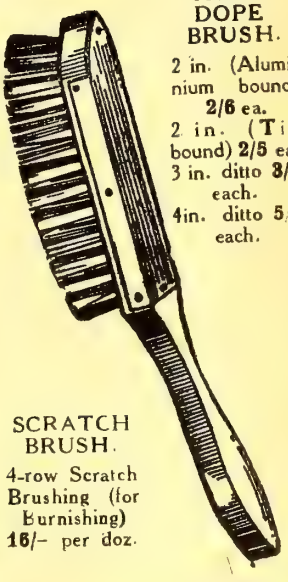
The "ASCOL" DOPE BRUSH.
2 in. (Aluminium bound) 2/6 ea.
2 in. (Tin bound) 2/5 ea.
3 in. ditto 3/9 each.
4in. ditto 5/- each.



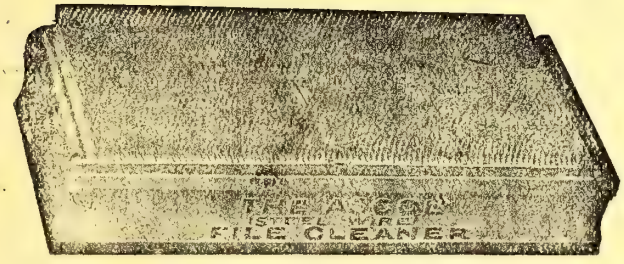
OP
USH.
er doz.



ENGINE BRUSH.
10 in. (Fibre) 8/6
(Hair) .. 9/6
per dozen.



SCRATCH BRUSH.
4-row Scratch Brushing (for Burnishing) 16/- per doz.



"ASCOL" FILE CLEANER.
The bristles are made of steel wire and the effect of its use, particularly on files which have been used for soft metals, is almost equal to re-cutting. 8/6 per dozen.

THE
AIRCRAFT SUPPLIES
COMPANY LTD
CONTRACTORS TO THE AIR BOARD.
Head Offices, Showrooms, and Stores:
ASCOL HOUSE, 125, Long Acre, LONDON, W.C.2.
Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

naging Director:
H. Mansfield.

Works:
ittle James St.
ondon, W.C.1.

Telephone:
Gerrard 276.
Private Branch Exchange

Telegrams:
"Upcast, Rand," London

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Works: Blackhorse Lane, Walthamstow.

AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

THE FOKKER TRIPLANE.

A good deal has been heard of late of the new Fokker triplane which is apparently being much used by the German fighting pilots. This machine is obviously copied from the Sopwith triplane, and is a German attempt to produce a small quickly-manœuvrable machine, apparently specially for fighting at the lower altitudes, owing to the fact that the very high-powered Albatros chasers with their heavy fixed-cylinder engines are, in spite of their high speed, at a distinct disadvantage in the type of rough-and-tumble fight between a number of aeroplanes at the same time, which is commonly known in the R.F.C. as a dog fight.

The Albatros seems to depend for its effect on one rush, generally in the form of a dive from above, but it is unable to spin round, or loop, or turn in the same small radius which is possible to the lighter and lower-powered British fighting machines. Hence, the introduction by the Germans of this new triplane.

The following description of a captured Fokker of the new type is taken from an article by M. Lagorgette in the first March issue of "L'Aérophile."

M. Lagorgette writes more or less as follows:—

The enemy triplane is in effect a copy of the Sopwith triplane. The analogy between the two machines is very great, but there are, all the same, differences: thus, the disposition of the wings is the same in the two types, but the form and dimensions differ considerably.

In the Fokker the three planes have neither a dihedral nor an arrow angle. They are staggered vertically, and the spans are unequal, growing smaller from the top plane to the lowest. In form they are rectangular.

The upper plane alone—which is the largest—has ailerons which project beyond the wing-tips.

The main spar is 7 ms. in length. Adding the width of the ailerons, one obtains the total span of about 7.6 ms.

The top plane being cut away in the middle to a considerable extent enables the pilot to see easily above him.

The middle plane, situated 0.75 ms. below the top plane, has a span of about 6.4 ms. The butts of the spars are attached to the fuselage on a level with the top of the cockpit.

The lowest plane which is again 0.75 m. below the middle plane is fixed to the base of the fuselage, and consists of two wings, each 2.5 ms. in length.

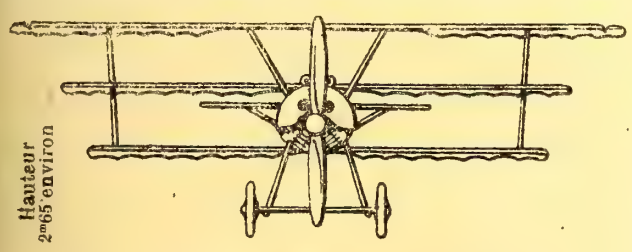
The chord of all three planes is the same—about 1.2 ms.—and, on each side, there is a single interplane strut which is very wide and holds both spars of each plane.

The remarkable thing about the machine, however, is that there are no cables, nor any other form of tension members to the

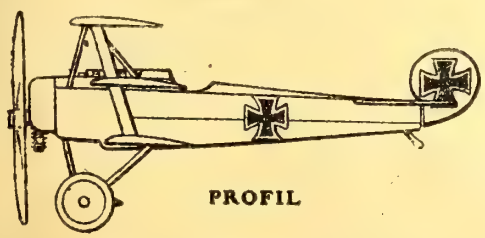


(From a German photograph.)

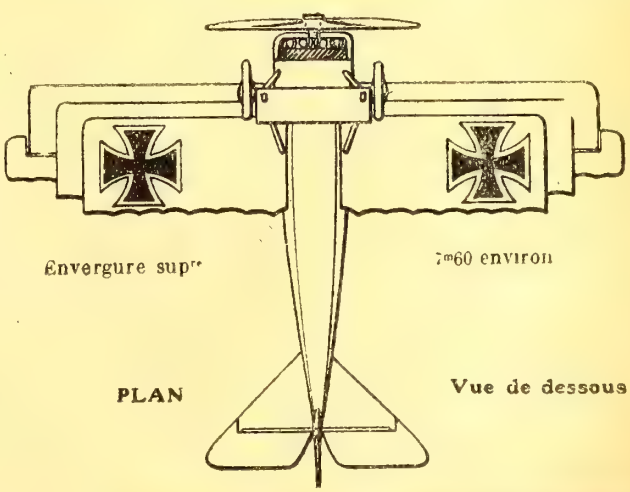
The Fokker Triplane in the Air.



FACE



PROFIL



PLAN

Vue de dessous

wings. The centre section struts, or cabane, diverge from the fuselage to the top plane, as in various other types of German machines when viewed from front or rear, but when viewed broadside these struts converge, forming an inverted V.

Controls.—The skeleton of the control members is metallic. The rudder is balanced, and is of the familiar Fokker type without a fixed fin. The elevator is, however, quite different from the ordinary Fokker practice. There is a large fixed tail-plane in the form of a triangle with the outer corners cut away to make room for the forward-projecting balanced sections of the elevator, the tail-plane and elevator together forming a large triangle with rounded corners.

Fuselage.—The fuselage is a girder construction of steel tubes covered with fabric. According to usual Fokker practice it is hexagonal in form, but ends up with a vertical stern-post, contrary to the usual Fokker practice in which the fuselage terminates with a horizontal bar similar to the Morane.

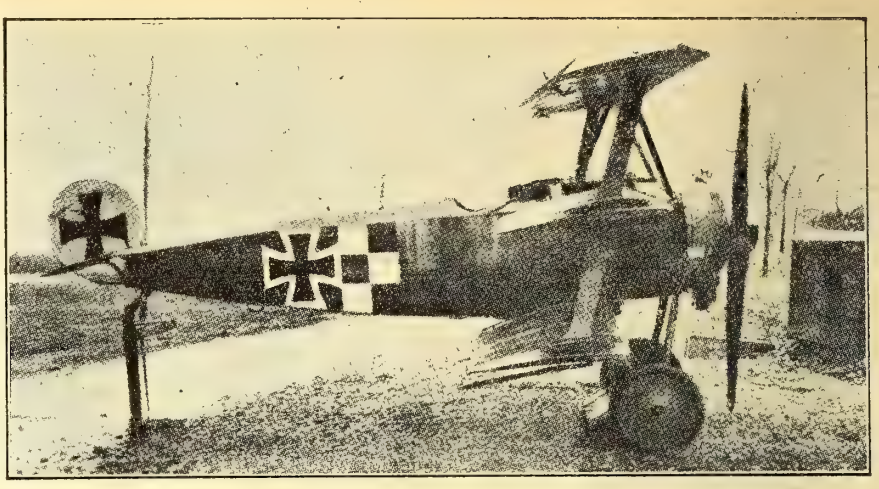
Engine.—The engine is an Oberursel rotary of 100 to 110 h.p., which is now practically a Le Rhône instead of being, as formerly, a Gnôme. The airscrew is an "Axial," with a diameter of 2.6 ms.

Undercarriage.—This is of the usual type, but has a very deep streamlined axle. It is furnished with two relatively large wheels, 710 mm. by 85 mm. placed 1.6 ms. apart.

The streamlining of the axle is, in fact, so deep that it forms a fourth lifting surface.

Armament.—Two fixed Spandau machine-guns are carried, firing through the airscrew either together or separately. They are put in action by the motor, and are controlled by Bowden wire.

Apart from this particular machine the Fokker Company construct other triplanes of greater span. The Germans state that these machines can climb to 4,500 ms. (practically 15,000 ft.) in 17 minutes. It is also stated that the late Rittmeister Baron von Richthofen used one of this type.



Side View of the Fokker Triplane.

REPORT ON THE FOKKER TRIPLANE.

The following report, which has been issued by the Technical Department of the Department of Aircraft Production, Ministry of Munitions, is a brief critical summary of the data obtainable from the Fokker Triplane now in the Aircraft View Rooms, together with such preliminary information as has been received from the Expeditionary Force. A fuller report may be issued in the near future, if further inquiry shows that the machine has features of interest. At present, however, the Fokker appears to be one of the poorest of modern German designs.

General Description.

As regards outline design, the machine is somewhat similar to the Sopwith Triplane and is in general of orthodox type.

The chief point which arises from a preliminary examination is the absence of external bracing wires. This point will be dealt with later.

Constructional Design.

It is from this standpoint, probably, that the machine is of greatest interest. The designer appears to have made every effort to reduce head resistance, even at the expense of increase in weight. In some respects, also, his efforts have tended to grave structural weakness.

Wing Structure.

The unique "twin" spar is shown in Fig. 5. It consists of two box-section tapering spars joined by transverse ply-wood. As far as can be gathered at present, the fore and aft shear strength of this built-up member is supplied by one port and one starboard bulkhead of ply-wood in each plane. This appears quite inadequate, especially in a high speed machine, even if we disregard the possibility of buckling of the laterally-unstabilized ply-wood in nosediving.

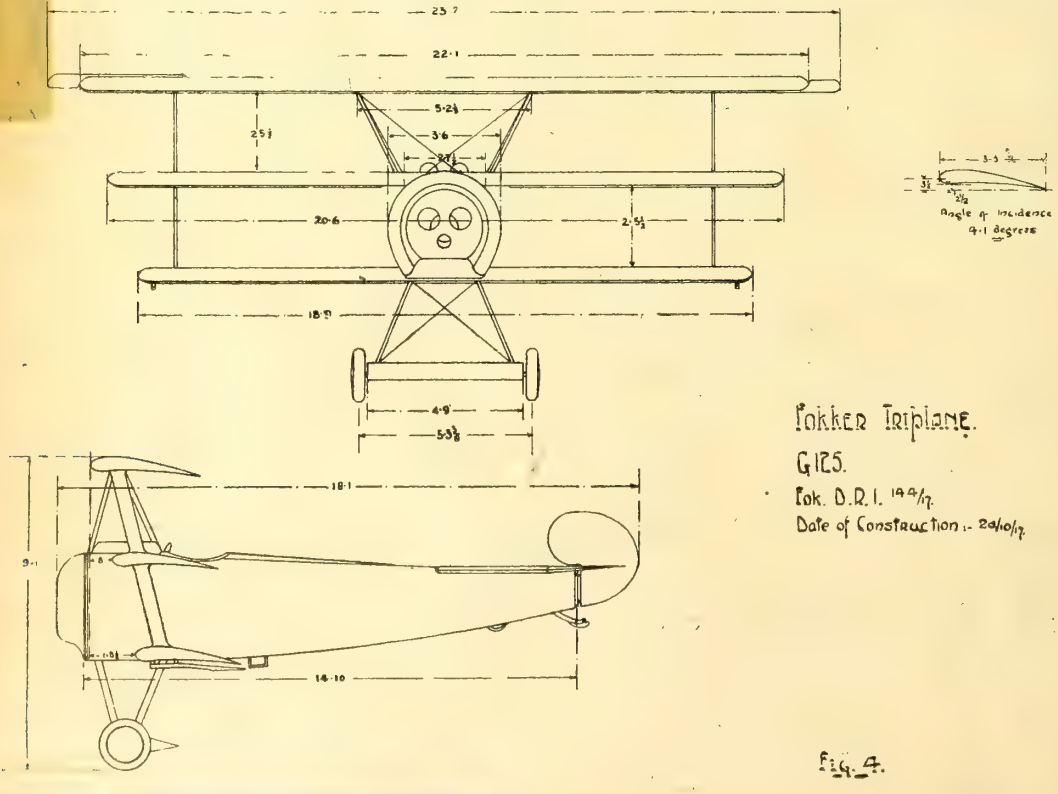


Fig. 4.

Apart from this point, the internal wing structure presents no peculiarities. From the front spar to the leading edge, the upper surface is stiffened with ply-wood as is usual on many modern scouts.

The nature of the main cellule structure is a typical example of the high price paid for reduction of resistance. Interplane wiring is dispensed with, and structurally the main frame may be regarded as three pairs of cantilevers, tied by pseudo-struts near the wing tips.

On a machine of relatively short span this cantilever construction may be rendered possible by the use of spars of great depth, and the ply-wood box type spars employed meet this condition, owing to the abnormally high thickness-chord ratio of the aerofoil section.

It is questionable whether the gain in

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

Offices & Works
HENDON, N.W.9.

overall efficiency by deletion of bracing wires is sufficient to balance the loss due to the use of a "high lift" section; this question naturally becomes more acute at high speeds, especially when at altitudes not approaching the ceiling; it is also rendered acute by the abnormally small gap-chord ratio employed.

The function of the interplane "struts" appears to be that of ties which partially distribute the load from plane to plane. Their section is such that they can hardly be expected to withstand reverse loading, and it is thought that this fact may be one explanation of the bad name which the Fokker has earned by breakage in the air.

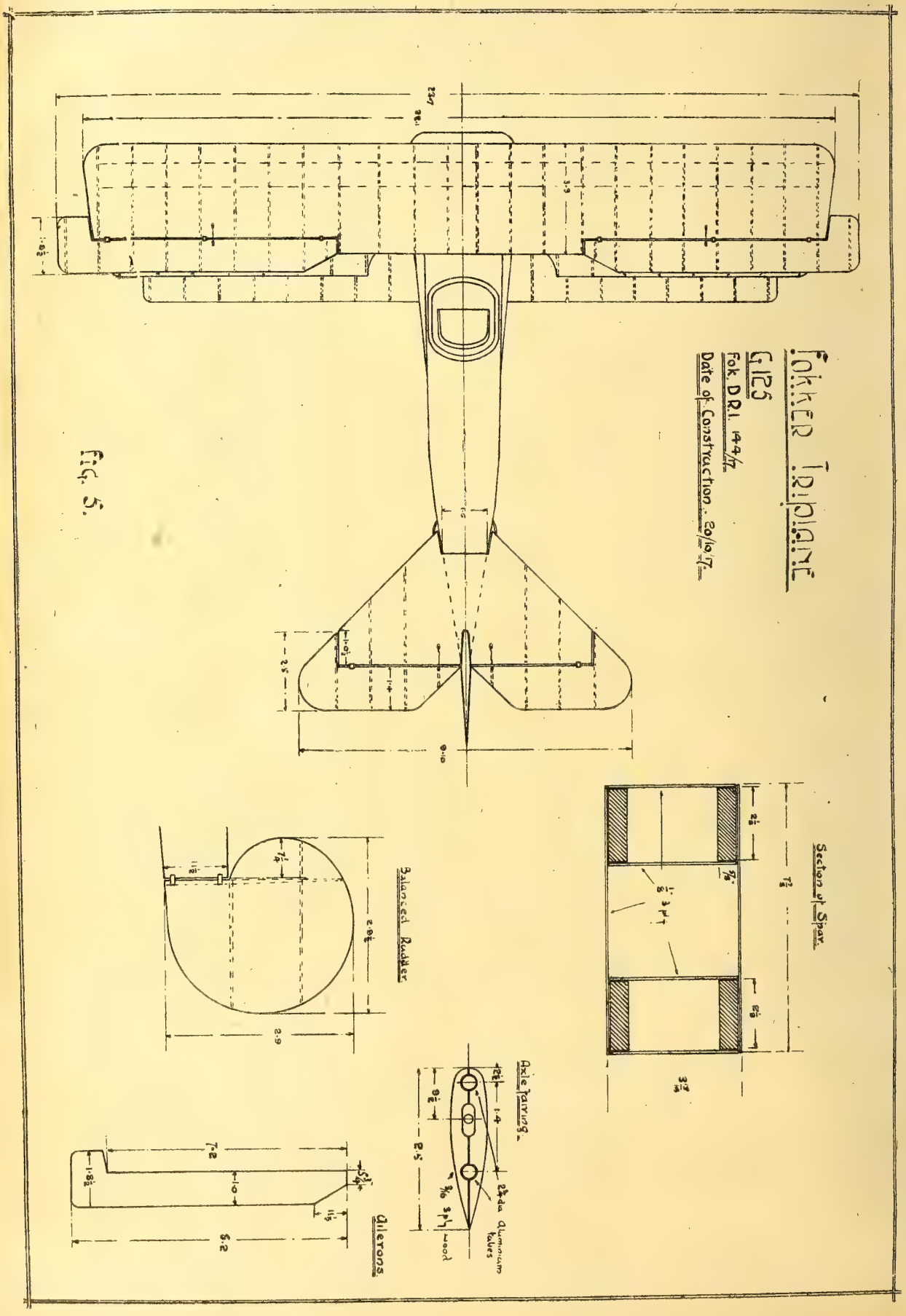


FIG. 5.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

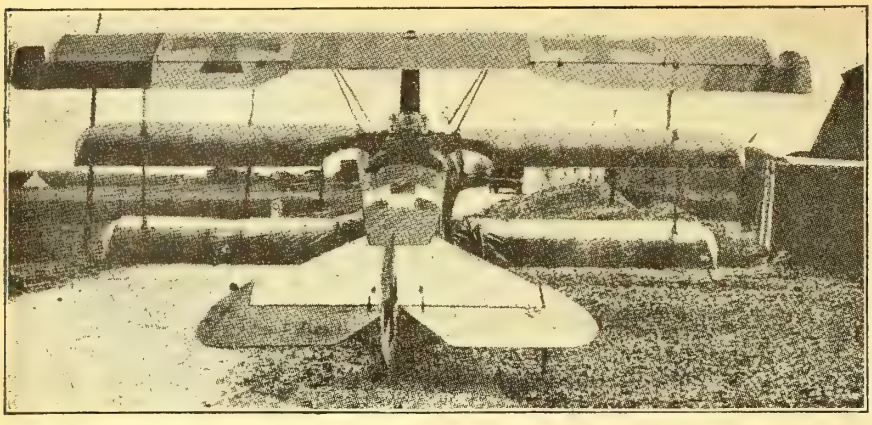
UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.



Rear View of the Fokker.

Tail Unit Structure.

Here again we find that reduction of resistance has been attained by deletion of external bracing. In this case, however, the tail unit being largely of tubular construction the cantilever structure, beside being heavy, is very weak. The proportions of the framework are approximately such as obtain on most normally-braced frameworks, and once more an explanation suggests itself for the structural failures experienced on this type.

Fuselage Structure.

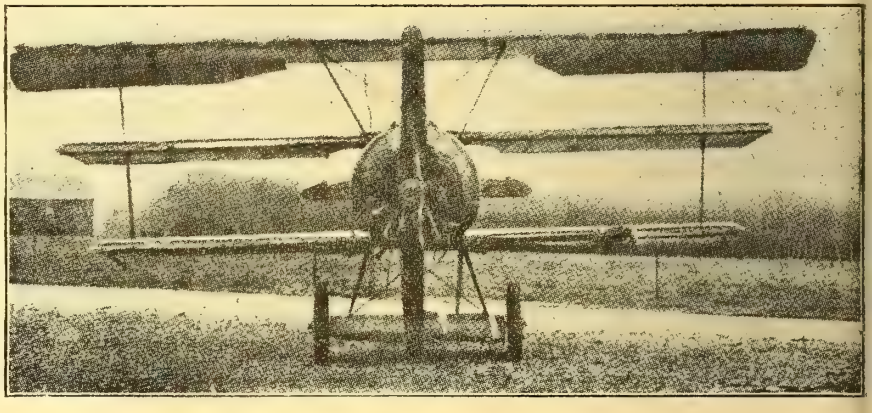
The framework of the fuselage is built up from steel tubing butt-welded at the joints. The standard wiring attachments consist of a short length of small tubing bent to the form of a quadrant or semi-circle (as required), and welded into the corners of cellules (see Fig. 7). The bracing wires are looped round these attachments, doubling back upon themselves (see Fig. 7), thus functioning as a single wire of double length.

Splices are dispensed with, but beyond that nothing good can be seen in this method of wiring, which is heavy and very weak, as its "fixing strength" is that of a wire doubled round a small diameter pin in place of twice that strength, as is obtained by splicing.

The use of welding in the building up of the fuselage also appears to be a weak feature. Vibration and reversal of stress cannot be taken adequately by such a structure. The corner attachments are somewhat reminiscent of the well known Short U-bolt. The U-bolt had the standardisation advantages of the Fokker fitting, and, in addition, without further sacrifice in weight, was a far more reliable and robust wiring attachment.

Summary of Constuctional Criticism.

On broad lines little good can be said of the Fokker structure. The designer appears to have employed considerable ingenuity (or exhibited considerable mental slackness) in devising schemes whereby slight increase of manufacturing speed has been purchased at the price of grave structural weakness or increased weight.



Front View of the Fokker.

Where speed of production has not tempted him, his aim has been reduction of resistance. Here also, strength—and above all, permanence of structural rigidity—has been disregarded, and yet it is hard to see what notable gain of "fineness" has been attained.

Wing Tip Skids.

These are rigidly-fixed ash skids located under the wing struts. The reason for fitting them is obscure, as they can only come into play as a result of an appallingly poor landing, and if they did come into play, would certainly buckle the flimsy interplane struts.

Aerodynamical Features.

Certain of these features have been mentioned already. In this respect also, the design shows evidence that it has been carried out hastily and in a slovenly manner. There are signs of considerable ingenuity, but they are often marred by lack of broad consideration.

Wing Design.

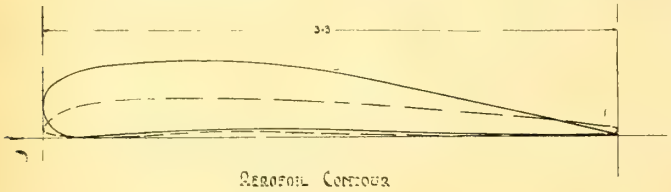
Here, for instance, we have the elimination of external wiring. The "wireless" machine is not a new idea; many constructors have realised its good points, namely, the saving of wire resistance, and the diminution of tuning-up troubles.

The Fokker designer has missed the counterbalancing defects, and his method of attack has led him into two grave faults. In the first place, the cantilever construction adopted is not only weak, but essentially non-rigid. The deformation under manœuvring stresses and the consequent variations of aerodynamical load-distribution would appear to render the problem of controllability curiously complicated.

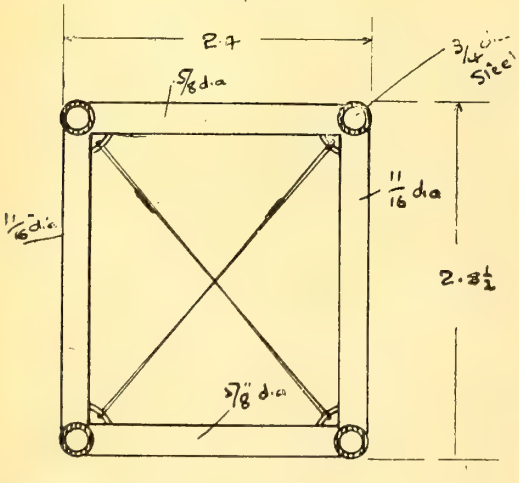
Further, the high cambered section of the aerofoils cannot but counteract the slight advantage due to the saving of wire resistance. Experience has shown that "low lift" aerofoils cannot be beaten for use on scouts, and that whatever advantage in climb and altitude-flying capacity may be attained by the use of "high lift" sections is cancelled and far more than cancelled by the excessive horse-power required at fine angles of attack.

When one considers the triplane effect (especially on small gap) which must, from first principles, obtain with such a deeply-cambered section the inefficiency of the main planes becomes evident.

Fig. 6 shows the amazing contrast between the Fokker section



Aerofoil Contour
Fig. 6



Section of Fuselage.
Fig. 7.

" " CONTRACTORS TO " "
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge Motor Factory

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

KINDLY MENTION " THE AEROPLANE " WHEN CORRESPONDING WITH ADVERTISERS.

(full line) and R.A.F. 15 (dotted line), which may be taken as typical of British practice for similar machines.

Controls.

All control surfaces are balanced, but the method of balancing is inferior to that employed on the Albatros.

Ailerons are fitted to the top plane only, a type of construction which has been shown to be inefficient.

Engine.

The Agricultural Hall machine has no engine, but information received from overseas states that the engine is an Oberursel, very similar to the 110 H.P. Le Rhone. In fact, it is understood the only differences are slight points of detail design, and the relative poverty of general finish. For instance, the nose piece is in two portions, the propeller shaft being separate from and bolted to the front plate of the engine.

The carburetter is a French-made Tampier bloctube, presumably obtained from a captured machine.

The oil pump appears to be a German copy of the standard Le Rhone oil pump.

The magneto is a Bosch.

Armament.

Two Spandau guns are fitted, firing forward through the propeller, and fitted with synchronising gear of the direct flexible drive type, a pinion on the flex shafting engaging with the gear wheel which meshes with the magneto and oil pump drives.

The guns are controlled by Bowden wires, from thumb-pushes on the control lever. Three pushes are fitted, two for firing the guns independently, and the third for simultaneous control.

Dimensions and Data.

(Certain Dimensions are also shown in the Figs.)

Identification Marks.

R.F.C. No. G.125.
Maker's No. 1856.
Military No. FOK. D.R.I. 144/17.
Date of construction, 20/10/17.

Weights (as stencilled on Machine).

Weight, empty	376 kg. =	829 lbs.
Permissible load (including fuel)	195 kg. =	430 lbs.
Total weight	571 kg. =	1259 lbs.

Weight of Engine.

334 lbs., including hub, magneto, oil pump, and carburett
(Note :—Weight of 110 H.P. Le Rhone is 330 lbs.).

Tank Capacity.

Oil, 4 gallons } approximate.
Petrol, 16 gallons }
(approximate duration—2½ hours at 10,000 feet).

From the above it is possible to construct the following a proximate weight analysis : —

Fuel, oil and tank	170 lbs.	allowing tank 18 lbs.
Crew	180 lbs.	
Military load	98 lbs.	
Engine and propeller	358 lbs.	(allowing propeller 24 lbs.)
Structure	453 lbs.	(including engine bearers and instruments).
Structure percentage	36	

Surface of main planes—205 sq. ft. (approximately).
Estimated B.H.P. (by analogy with 110 H.P. Le Rhone)—1
lbs. per sq. foot.—6.14.
lbs. per B.H.P.—11.15.

IN ENEMY EYES.

A Neutral Correspondent writes :—

Following is a translation of the description of the British S.E.v.A. (scouting experimental) fighting single-seater, published in the March issue of the German Airmen's Journal, "Luftwaffe," reading thus :—

The aeroplane in question was built by Vickers, Ltd., and numbered B.507, wearing further as recognition initial or that of a squadron an A as well as a white circle. The propeller is marked : S.E.v.A., which leads to the idea that the older model of this same aeroplane type with the 150 h.p. Hispano motor not geared down is called S.E.v.

The biplane has a surface of 22.8 square metres, and both planes, connected with but one pair of struts to each side, hav span of 8.15 metres, and a chord of 1.52 metres, the gap fr the top of the fuselage amounting to 0.45 metre.

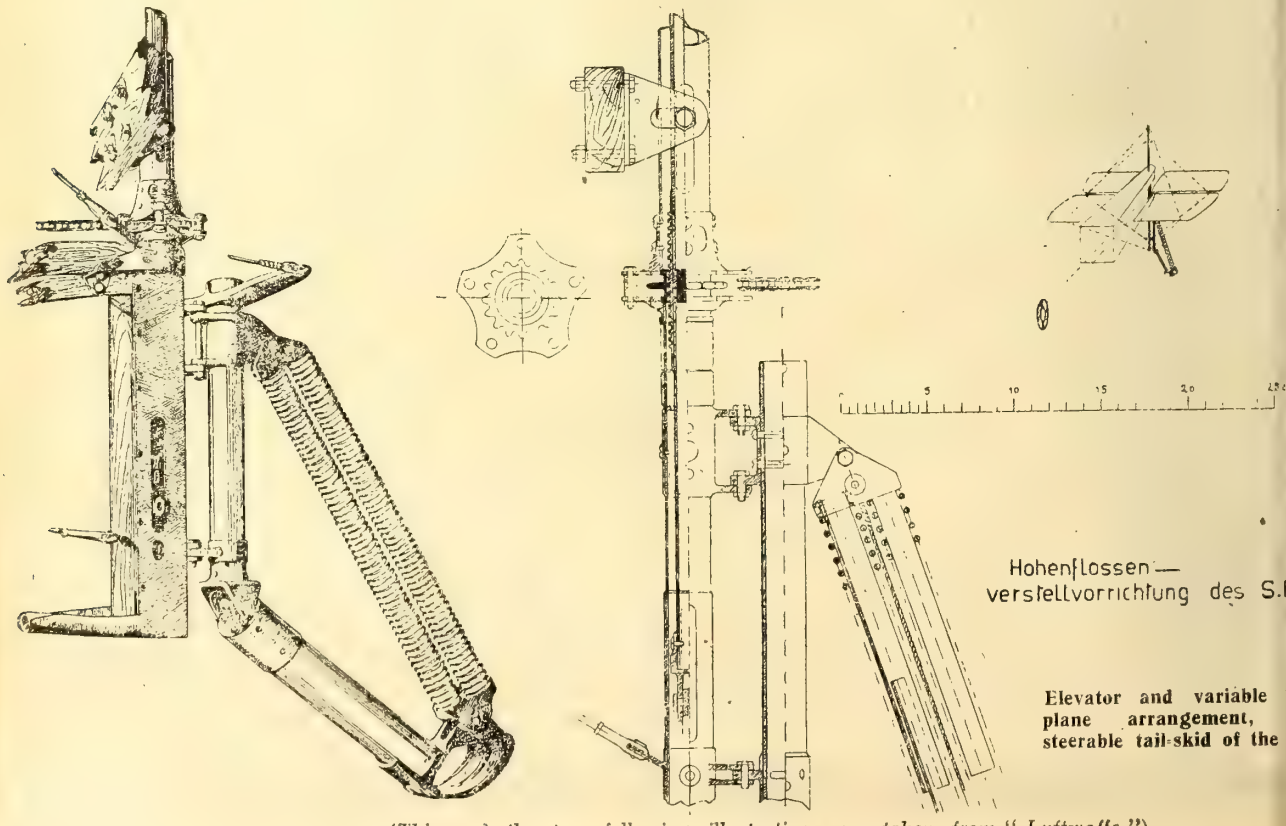
No arrow-shape prevails. The V-shape of the equal-sized e of the upper and lower planes mounted on the centre section respective body rudiments amounts to 1.71 degrees.

The sight field of range is improved by cutting the centre s tion in the middle and the lower planes near the body.

Above the angle of incidence is 5 deg. mean, below by the b 6 deg., by the struts 5 deg.

Both plane spars show sections of I shape, whereas the lon rons of the rudiment pieces, running through the body are s

20 Der englische S. E. V. A.-Kampf-Einsitzer Nr. 5/0



Elevator and variable plane arrangement, steerable tail-skid of the

(This and the two following illustrations are taken from "Luftwaffe.")

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT



AS A DRUM.

Trade Mark.

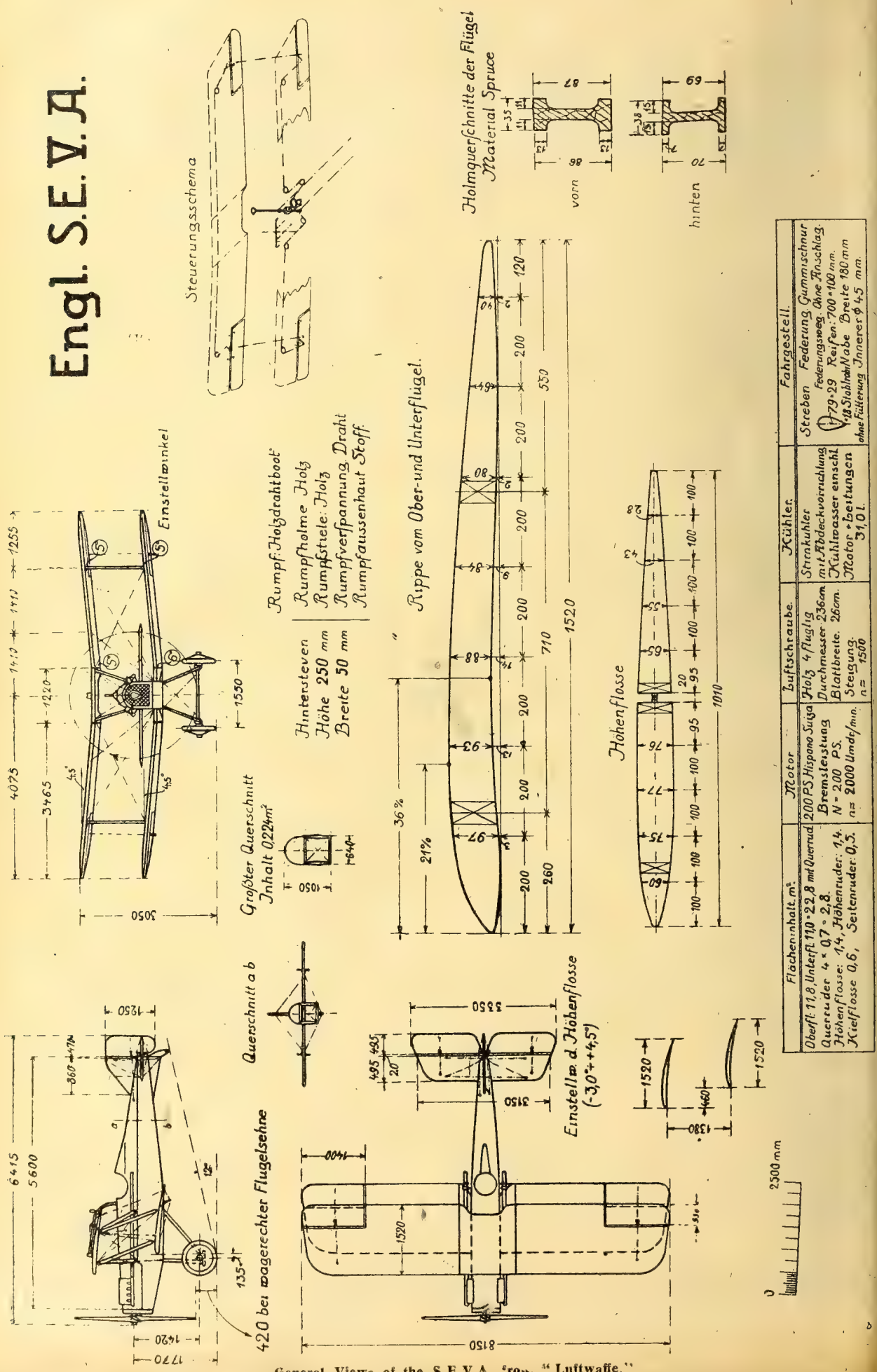
THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:
30, Regent Street, Piccadilly, S.W.1.
Wire—"Ridleypren Piccy, London."
" Phone—280 Gerrard

Works
5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.
Telephone—Willesden 2346 & 2347.

Der englische S. E. V. A.-Kampf-Einsitzer



Flächeninhalt m²	Motor	Luftschraube	Kühler	Fahrgestell
Oberfl. 11,8, Unterfl. 11,0 = 22,8 m/Querrud. 2,0 m²	200 PS Hispano Suiza	Holz 4flügig	Strinkuhler	Streben Federung Gummischnur
Querruder 4 × 0,7 = 2,8.	Bremsleistung	Durchmesser 236cm.	mit Abdeckvorrichtung	Federungsweg ohne Anschlag.
Höhenflosse: 1,4, Höhenruder: 1,4.	N = 200 PS.	Blattbreite. 26cm.	Kühlwasser einschl.	1 Paar 29 Reifen: 700 × 100 mm.
Kielflosse 0,6, Seitenruder 0,5.	n = 2000 Umdr/min.	Steigung:	Motor-leitungen	1 Stahlnabe Breite 180 mm
		n = 1500	31,0 l.	ohne Futterung Inneres ϕ 4,5 mm.

General Views of the S.E.V.A., from "Luftwaffe."

DOPE CAN

BE SAVED, BY USING OUR PATENT NON-EVAPORATING

DOPE CAN

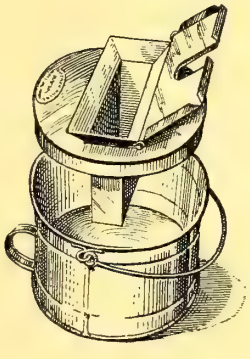
AND IS BEING SAVED BY AIRCRAFT MANUFACTURERS
WHO FIND OUR

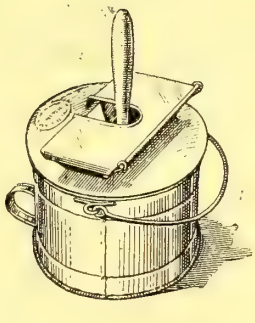
DOPE CAN

INDISPENSABLE.

APPROVED AND RECOMMENDED BY THE AIR MINISTRY.

SEND
FOR
SAMPLE.

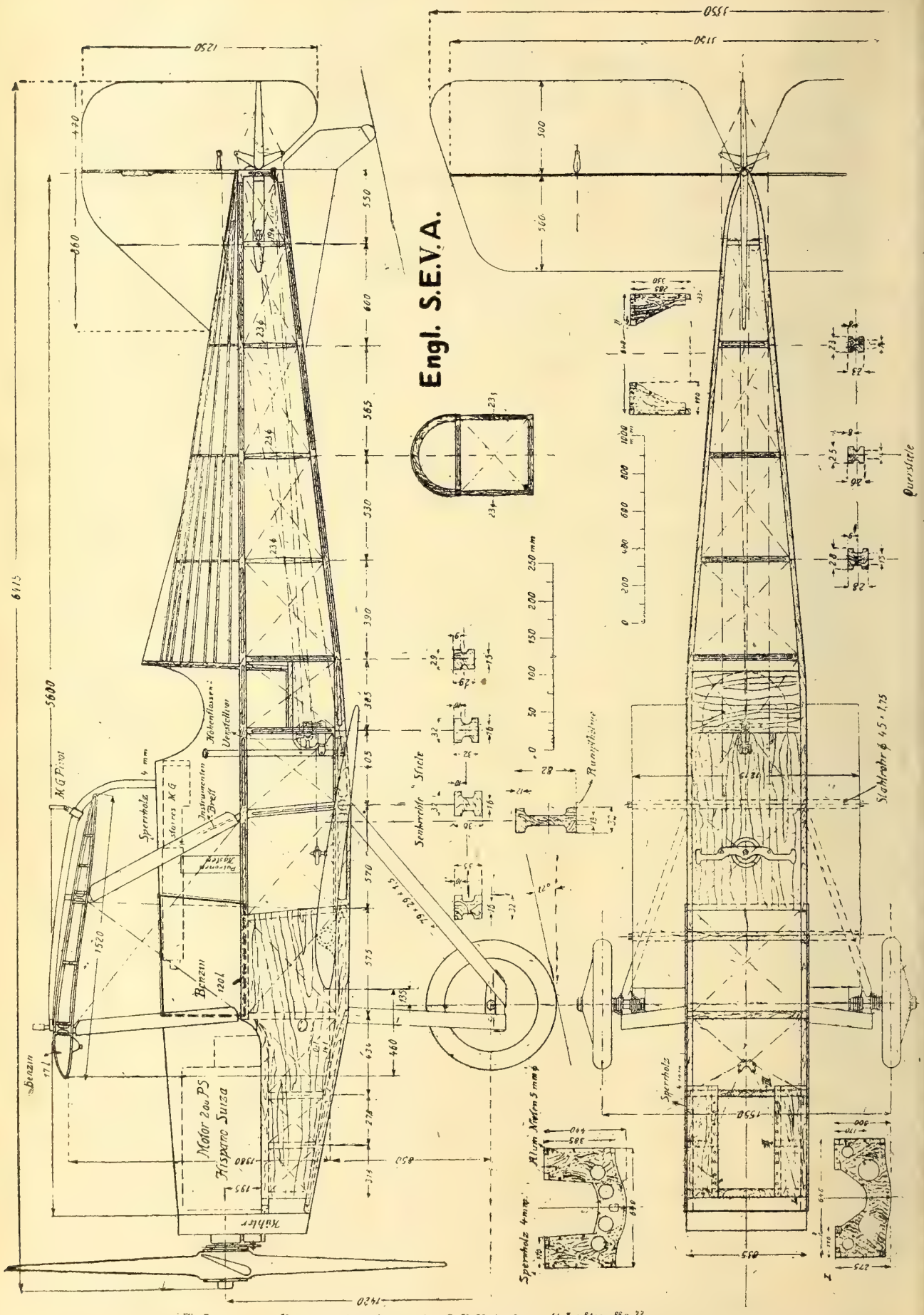




72/-
PER DOZEN.

ARTHUR HILL & CO.,
SHEET METAL WORKS,
SILCHESTER ROAD,
LONDON, W.10.

Phone : 1443 PARK.



Fuselage Details of the S.E V.A. from "Luftwaffe."

(*The description is continued on p.* 1629.)

GALLAY ACHIEVEMENTS

Their excellence and the reasons thereof

1. Our **system of construction** is proved by Government test to be 15 per cent. more efficient than any other type with equivalent water space and air orifice.

2. It is **lighter** per B. Th. U. dissipated than any other type.

3. It is **stronger** and yields less to impact than any other systems and owing to homogeneity of structure it will stand greater stresses vertically, horizontally or frontal.

4. The strength is inherent and not dependent on **tanks** or **casings**. The latter can be entirely dispensed with.

5. Every particle of metal used in construction acts as a **cooling agent.**

6. Each **waterway** is **regular** throughout its length.

7. **Air resistance** is reduced to the **minimum**, no blobs of solder obstruct the air passages, a regular wind cutting edge is always presented.

8. We have **reduced** the **radiator factor** to limits hitherto considered impossible.

9. Our system is suitable for **pump** or **Thermo** syphon.

10. We are Aero engineers and our staff comprise **specialists** in each department.

WE WERE THE PIONEERS
OF
LIGHT, STRONG and EFFICIENT RADIATORS

GALLAY RADIATOR CO., LTD.,

L. T. DELANEY, Managing Director.

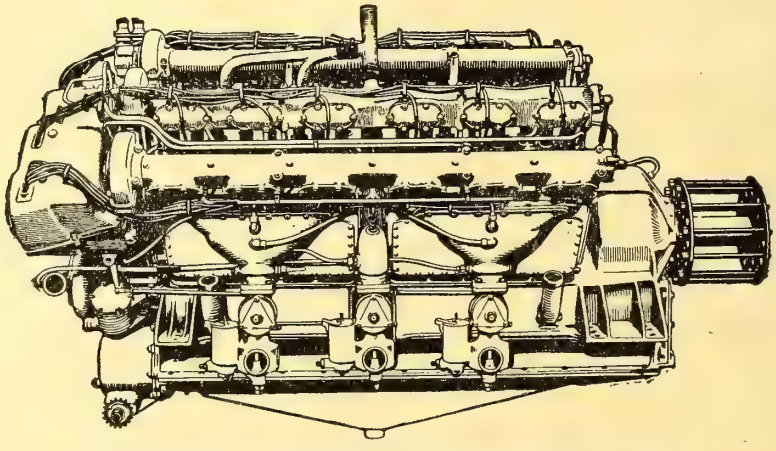
198, Great Portland Street, London, W.1.

Telephone—4826 Mayfair. Telegrams—"Galyradico, Wesdo, London."

L.T.D.

Original in conception, Sunbeam-Coatalen Aircraft Engines have not only retained their supremacy, but have also added to their prestige by giving service which only the finest engineering practice could make possible.

SUNBEAM-COATALEN AIRCRAFT MOTORS



18-CYLINDER SUNBEAM-COATALEN AIRCRAFT ENGINE.

THE SUNBEAM MOTOR CAR CO., LTD.,
WOLVERHAMPTON.

SELSDON

AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W. 1.

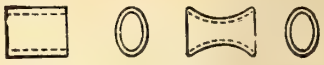
Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO. CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.


SMALL FERRULE.
PATTERN "A."

WE CAN SUPPLY
THESE AT ONCE


Nos 1. 5 & 6 Nos 2 3 & 4
SMALL FERRULES
PATTERN "C."

IN VARIOUS GAUGES AND LENGTHS
- SEND FOR FULL PARTICULARS -

FERRULES FOR AIRCRAFT WORK

THE AEROPLANE STEEL TUBE AND PRESSWORK ARTIFICERS


SMALL FERRULE.
PATTERN "B."

ACCLES & POLLOCK LIMITED

OLDBURY BIRMINGHAM

Telegrams: "ACCLES," OLDBURY Telephone: OLDBURY 111 (4 lines
A.B.C. CODE, 5th Ed.


SMALL FERRULE
PATTERN "D."

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street Works, BIRMINGHAM.

ALUMINIUM CASTINGS





SAND or DIE
of Every Description
2 H.P to 600 H.P

CHILL CASTINGS for AEROPLANES A SPECIALITY
Best Metal. Good Castings. Quick Deliveries
Repairs to Aluminium Crank Cases, Gear Boxes etc., by Special Process.

Telephones 3546 CITY 4879 CENTRAL

Telegrams KRANKASES ISLING LONDON

R·W·COAN

The Aluminium Foundry
219, GOSWELL ROAD,
LONDON,
E·C

COAN CASTS CLEAN CRANK CASES

Contractor to H.M GOVERNMENT

NOW IN A POSITION TO EXECUTE ORDERS.



The "Guardian Angel" Parachutes

THE GUARDIAN ANGEL PARACHUTES
TRADE MARK
(REGISTERED)

THE CLASS OF OUR LIFE-SAVING EQUIPMENT.

The basic characteristics of our Parachutes, which differentiate them from all others, and for which we hold master-patents, are automatic (i.e., compellative) opening, and static and kinetic control (i.e., control at rest and in action) of all their component details. The ordinary parachute is under no sort of control, and what we have accomplished is to convert this most insubordinate Apache of the Air into a staid servitor, incapable of acting in any other than the designed way. We have made the Parachute into an automatic machine, so that failure to open and entanglement of rigging has become a physical impossibility. Every Type of Parachute made by us possesses these paramount and indispensable principles of machine action. The aviator makes his jump, and the Parachute automatically does the rest.

THE RANGE OF OUR LIFE-SAVING EQUIPMENT.

Life-saving Parachutes for school machines on the Training Grounds.

Life-saving Parachutes for heavy bombing machines, fighters, and scouts.

Life-saving Parachutes with minimum weight and without additional air resistance for the fastest machine that flies, and capable of release from any vertical or horizontal angle, or when flying upside down.

Basket-Parachutes for instantly detaching the basket Balloons, with a high but constant-speed initial drop from a fired gas-bag, automatically opening into the low-speed descent required for a safe landing.

Basket Parachutes for instantly detaching the basket containing two observers, their instruments and records, from a fired gas-bag, with high-speed initial fall, changing automatically to slow-speed descent for the safe landing. Parachute instantly released on landing, to avoid dragging the basket.

Variable-speed Parachutes, to permit a sudden high-speed drop, controlled by the Parachutist, to escape from an enemy aeroplane, and to stop on any portion of the grade of descent to avoid an objectionable landing. This variable-speed apparatus is applicable to the whole range of our Parachutes.

Non-spinning shock-absorber slings, taking all shocks off Parachute and man.

Aviator's Harness, distributing the stresses over those parts of the body best able to sustain them, and instantly releasable when alighting on land, on a roof, in a tree, or in water.

OUR EQUIPMENT IS THE RESULT OF ENGINEERING SCIENCE APPLIED TO DIFFICULT AIR PROBLEMS. WE BELIEVE THAT ITS EXTENDED USE WILL DOUBLE THE FLYING LIFE OF OUR FIGHTERS AT THE FRONT.

RELIABILITY—First. *RELIABILITY—Second.* *RELIABILITY—ALL THE TIME.*

E. R. CALTHROP'S AERIAL PATENTS, LTD.

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines): London Wall 3266 and 3267. Telegraphic and Cable Address: "Savemalivo-Ave-London."

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

ENGINEERING EMPLOYERS' FEDERATION 1896

Telegrams
JONAS.
SHEFFIELD.

REGISTERED
I C NOVO
TRADE MARKS.

Telephone
No. 4660.
Private Branch
Exchange.

S.B.A.C. The Society of British Aircraft Constructors

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. — **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. — **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. — **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404

Davidson Aviation Co., Ltd., Hammersmith, W.S. Hammersmith 1902 (3 lines)

Dawson, John, & Co., Ltd., Victoria Works, Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 612.

Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Martinsyde, Ltd., Brooklands, & Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout. Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London" Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193

Short Bros Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378

Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 741

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Wimbledon 1314

Airships, Ltd., High Street, Merton.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand & Die)

Coan R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846.

Bearings (Etonia Cast Phosphor Bronze)—

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 995, 996, and 7000.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Witney Co., Ltd., Salisbury House, London Wall, E.C.2. "Wraithless, 'Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 01

Carburettors—

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4070

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Castings—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham" Central 1223

Castings (Aluminium, Brass, Bronze, Machined or Rough)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1 Regent 2165

Dunhill's, Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (4 lines)

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728 "Aviduction, Phone, London"

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, L., & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1 "Cellulate, London." Regent 4046

The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., Broad Street House, New Broad Street, E.C.2. "Alawb, London." London Wall 5359-3622

Clark, Robert, Ingham & Co., Ltd., House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87 Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1293

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1010.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3996.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085

The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Eleventi London" Walthamstow 408 (2 lin

Electrical Accessories—

Belling & Co., Derby Road Works, Monta Road, Upper Edmonton, N.18. "Bell Edmonton." Tottenham 1

Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 1

Mann, Egerton & Co., Ltd., 177, Clevel Street, London, W.1. "Installing, road, London." Museum

Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. "renheit, Birmingham." Midland

The Rotax Motor Accessories Co., Ltd., toria Road, Willesden Junction, N.W "Rodynalite, Phone, London." Willesden 2

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry

Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 1

Electric Lighting and Power

E. Stanley Fardon, A.M.I.E.E., 67, Mo Street, Manchester.

Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 1

Electro Platers and Met Polishers' Engineers—

W. Canning & Co., 133-137, Great Hamp Street, Birmingham. "Materials, mingham." Birmingham 3622 Central (3 lin

Enamel—

Silico Enamel Co., New Cross, London, S

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, Londo 3540 Victoria (3 lin

Flexible Shafts—

Herbert Terry & Sons, Ltd., Reddi "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot lage, Bournemouth. "Etches, Winton." Bournemouth 1

Cambridge School of Flying and Aerodrome 308, St. Andrews St., Cambridge. "bon, Cambridge." Cambridge 5 and 1

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Paven House, London, E.C.2. London Wall 573 and 6

Galvanising—

Boulton & Paul, Ltd., Rose Lane Wo Norwich. "Aviation, Norwich." Norwich

Gauges—

J. A. Prestwich & Co., Northumberland P Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, A Birmingham. "Mosgear, Birmingham.

Glue—

Improved Liquid Glues Co., Ltd., Gt. He tage Street, E. (Croid.). "Exeroid Wapp, London." Avenue 3

Mendine Co., 8, Arthur Street, E.C. Bank 5

Oldroyd, Wm., & Sons, Ltd., 9, Mincing L E.

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albem Street, Piccadilly, W.1. "Shatterlys, Pi London." Regent 1

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & Southwark Street, London, S.E.1. "Kin London." Hop 372 (2 lin

Hollow Spars—

McGruer Bentwood Hollow Spar Co., C mercial Wharf, Lambeth, S.E. "Gabi son, Watloo, London." Hop

Robert Young's Construction Co., Ltd., Car bury Works, Canonbury Street, Essex London, N.1

Instruments—

British Wright Co., Ltd., 33, Chancery La W.C.2. Holborn 1

Instruments (Scientific, A meters, etc.)—

The Cambridge Scientific Instrument Co., L Cambridge. "Instrument, Cambridge" Cambridge

Short & Mason, Ltd., Macdonald R Walthamstow, E.17. "Aneroid, Ph London." Walthamstow

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Reddi "Springs, Redditch." Redditch

Buyers' · Guide.



...netos—

M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-1009

British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicks mag, Phone, London." Museum 430

British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

...l Manufacturers—

...ord, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham" Central 42-43

...ls in General— Avenue 1432

...rie, J. B., & Son, 30, St. Mary Axe, E.C.3.

...& Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 905, 906, and 7906.

...uel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

...l Parts and Fittings—

...s & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

...plane General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppishcut, Holborn, London." Holborn 4959.

...aft Supplies Co., Ltd., Ascot House, 425, ...ong Acre, W.C.2 "Upcast, Rand, ...ondon." Gerrard 276 (2 lines)

...tt & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2207.

...ss, Jones & Bayliss, Ltd., Wolverhampton. Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1021

...cburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)

...sh Metal (Kingston), Ltd., Kingston-on Thames.

...rie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

...bard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

...n. Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston, London." Museum 70.

...tford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261

...rtson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3066.

...ry, Owen, & Co., Darlaston South Staffs.

...oy, Joseph & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington ...

Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 110

Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Aircraft Construction Co., Harlow Works, Beckton Road, E.16. "Aercracons, Canning, London" East 1300

Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

...mpson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

...ler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

...l Shearing Tools—

...gomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

...l Spinnings—

...old & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

...iel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

...ic Bolts—

...more Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.

...ery Owen & Co., Darlaston, South Staffs.

...ellaneous—

...erson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

...den Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

...ish Metal (Kingston), Ltd., Kingston-on-Thames.

...n Bros., Ltd., Great Eastern Street, E.C.2. "Imbrowned, Bethroad, London" London Wall 6300.

...bert Flood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

...Lennan, John, & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines)

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.

The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg, Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London" Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London" London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7, and 8, Allsop Street, Upper Baker Street, W. Padd 4743

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 723

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London." Tottenham 2370-1.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4310.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120

Pyrometers—

The Foster Instrument Co., Letchworth, Herts "Foster Instruments, Letchworth" Letchworth 20.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield" Wakefield 266

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 5811 and 5812

Safety Belts—

Holmes, C. H., & Son, 58, Albert Street, Manchester "Safety, Manchester" City 443.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds" Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines)

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Seats for Aeroplanes—

Bowser, E., Air Cone Works, 50 Park Lane, Leeds Central 3473.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury" Oldbury 111 (3 lines).

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham" Central 1223

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

The Selsdon Aero & Engineering Co. Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Shock Absorbers (Elastic Cord)—

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham" Central 1223

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo. & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758

Springs—

Dart Spring Co., West Bromwich. "Dart West Bromwich." West Bromwich 322

Gabriel & Co., 4 and 5, A B Row, Birmingham. "Gabriel, Birmingham." Central 1223.

Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61 (3 lines)

Stampings—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.

Steel—

Allen, Edgar, & Co., Ltd., Imperial Steel Works, Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham" Smithwick 224

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Davhur, Phone, London. East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham" King's Norton 261-262

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Entikosil, Vic, London" Victoria 5073, 4210

Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham "Brown's Saw Mills, Wollaton" Nottingham 1526

J. Owen & Sons, Ltd., 100a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The Aeroplane Buyers' Guide.

Acceptance and Experimental Flights—
The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London" Gerrard 278 (2 lines)

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., 19, 20, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Victoria 4811
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edilcet, Phone, London" 3549 Victoria (3 lines)

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London" Kingsbury 1800
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne "Armstrong Avenue, Newcastle-on-Tyne." Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propeller, Leeds" Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Brabazon, J. C. Vereker, Hon., Hanworth Park Aerodrome, Feltham "Brabazon, Feltham" Hounslow 1620
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol "Aviation, Bristol." Bristol 3366
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudronian, Cricle, London" Hampstead 5531
Centre Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6 "Induction, Phone, London" Hampstead 4413 and 3414
Dennis Aviation Co., Ltd., Hammersmith, W.6 Hammersmith 1092 (3 lines)
Dawson, John & Co., Ltd., Victoria Works, Newcastle-on-Tyne "Aviation, Castle-on-Tyne." Central 2604 (2 lines)
Eastbourne Aviation Co., Ltd., Eastbourne Aircraft, Eastbourne "Lusitania, Eastbourne" 1370
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon "Aviation, Hyde, London" Kingsbury 1800
Hartley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydroplid, Cricle, London." Hampstead 7420
Hooper & Co., Ltd., 54, St. James's St., Piccadilly, London, S.W. "Sociable, St. James, London" Regent 612
Mann, Egerton & Co., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (3 lines)
Martinsyde, Ltd., Brooklands, Weybridge "Martinsyde, Weybridge" Weybridge 331; Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston Museum 3473
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2 "Nieuport, Cricle, London" Willesden 2435
Norman Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 38
The Regent Garage Co., Ltd., 126 to 140, New Kings Road, Fulham, S.W.6 "Carbolis, London" Putney 2241-2242
Roe, A. V. & Co., Ltd., Manchester "Avro, Manchester." City 8530-8531, Manchester
Saunders, S. E., Ltd., Eric Cowes, I.O.W. "Camotia, East Cowes" Cowes 115
Short Bros., Rochester, Eastbrook and Whitehall House, S.W. "Tested, Phone, London." Regent 88
Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 70
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. "Standair, Phone, London" East 2823
Vickers, Ltd., Crystal Court, Boat Store, Knightsbridge, S.W.1 "Vickerlist, Knights, London" Kensington 1480
Waring & Gillow, Ltd., Hanover Square, W. "Warisem, Ox, London" Museum 5600
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120
White & Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond Surrey "Whitecraft, Richmond, Surrey" Richmond 1865
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe." High Wycombe 84

Airships
Wimbledon 1324
Airships, Ltd., Digby Street, Merton
Short Bros., Rochester, Eastbrook, and Whitehall House, S.W. "Tested, Phone, London" Regent 88

Aluminium Castings (Sand & Die)
Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London" City 7848

Bearings (Etonia Cast Phosphor Bronze)—
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds" Central 3927

Blowpipes (Oxy-Acetylene)—
Acetylene Corporation of Great Britain, Ltd., The, 20, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

Brass Sheets for Tipping Propellers—
Pratt & Co., 36, Leadenhall Street, London, E.C.3 "Poetry, Ion, London"

Buildings—
Avenue 993, 006 and 7[illegible]
Bolton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Piper, J. W., & Co., Church Road, Merton, Surrey Wimbledon 1434 (Abbey Surrey)
Rubery, Owen & Co., Darlaston, South Staffs Saddlery House, London
The Whitley Co., Ltd., Salisbury House, London Wall, E.C. "Whitley, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Carburettors—
Hobson, H. M., Ltd., 44, Vauxhall Bridge Road, S.W. Victoria 4070

Casein
Neuschatel Syndicate, Ltd., 30, Lloyds Avenue, London, E.C.3 "Strawboard, London" Avenue 31 and 35

Castings—
Gimbel & Co., 4 and 5, A.B. Row, Birmingham "Gimbel, Birmingham" Central 1223

Castings (Aluminium, Brass, Bronze, Machined or Rough)—
Gimbel & Co., 4 and 5, A.B. Row, Birmingham "Gimbel, Birmingham" Central 1223

Celluloid (Non-Flam.)—
Greenall & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 1386

Clothing—
Burberrys, 8-9, Haymarket, S.W.1 Regent 2[illegible]
Dunhill, Ltd., Euston Road, N.W.1 "Dunhill, Euston" Museum 3405

Coloured Rags—
Joseph, A., Earl Street, London Road, Southwark, S.E.1 "New Mungo, Sedist, London" Hop 83, 361, 4272

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Tubes, Oldbury." Oldbury 211-14 (3 lines)
Ford Engineering Co., Ltd., Paberton Works, High Rd., Kilburn, N.W.6 Hampstead, 4738 "Ford, Phone, London"
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond "Veros, Richmond" Richmond 1681
Rotax, Ltd., Rotax Works, Hyde Road, Willesden, London, N.W.10 "Rotaxite, London" Willesden 2480
Short Bros., Rochester, Eastbrook and Whitehall House, S.W. "Tested, Phone, London." Regent 88
Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 70
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. "Standair, Phone, London" East 2823
Vickers, Ltd., Crystal Court, Boat Store, Knightsbridge, S.W.1 "Vickerlist, Knights, London" Kensington 1480
Waring & Gillow, Ltd., Hanover Square, W. "Warisem, Ox, London" Museum 5600
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120
White & Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond, Surrey "Whitecraft, Richmond, Surrey" Richmond 1865
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe." High Wycombe 84

Cords, Tapes, and Threads—
Mackenna, T., & Co., 30, Newgate Street, E.C.1 "Mackenna, London" City 3115

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1 "Tedebrec, Piccy, London" Gerrard, 2312
British Cellulose Co., 8, Waterloo Place, S.W.1 "Cellulate, London." Regent 4046
The British Emaline Co., Ltd., 30, Regent Street, S.W.1 "Rubyprem, Piccy, London" Gerrard 280
Cowan, Ltd., Bread Street House, Bow, Broad Street, E.C.2 "Varn, London"
Clark, Robert, Ington & Co., Ltd., House, Bilford Street, Strand, W.C. "People, Westrand, London" Regent 3923

Engines and Parts—
Allen, W. H. Son & Co., Ltd., Queen's Engineering Works, Bedford "Pump, Bedford" Bedford No. 1
Arrol Johnston, Ltd., Dunfermline "Motor, Dunfermline" Dunfermline 284-5-6
The Bentz School of Driving, Ltd., The Broom, Chelsea, N.W.2 Hampstead 3301
Beardmore Aero Eng., Ltd., 122, Great Portland Street, W.1 "Beardcore, London" Gerrard 235
Dudbridge Iron Works, Ltd., Stroud, Glos. Victoria Street, London, S.W.1 "Aero, Flight, Vic, London" Victoria 87
Gordon Waines & Co., Ltd., Weybridge "Mercedes, Weybridge" Weybridge 350 (7 lines)
Green Engine Co., Ltd., Tuckenham Richmond 1203
Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne, Hammersmith, London" Hammersmith 1010
Napier & Son, D., Ltd., 14, New Burlington Street, London, W. and at Acton, W. "Nutrifier, London" Gerrard 8926.
Robertson, J. H. & Co., 91, Lower Thames Street, London, W.C. Regent 3960.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London" Gerrard 1654-6.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 683
The Gnome & Le Rhone Engine Co., 1, Victoria Street, S.W., and 16, Great Marlborough Street, London "Gnomrhone, Wesdo, London" Victoria 4[illegible]

Electrical Accessories—
Belling & Co., Derby Road Works, Mogden Road, Upper Edmonton, N.9 "Belling, Edmonton" Lottenham 1[illegible]
Johnson & Phillips, Ltd., Charlton Works, S.E.7 "Juno, London" Central 2[illegible] (6 lines)
Mann, Egerton & Co., Ltd., 39, Great Marlborough Street, London, W.1 "Instrument, London" Museum 4[illegible]
Premier Electric Heaters, Ltd., 248, 250, 300, Bradford Street, Birmingham "Premiheat, Birmingham" Midland 1[illegible]
The Rotax Motor Accessories Co., Ltd., Rotaxia Road, Willesden Junction, N.W. "Rotaxite, London" Willesden 2480
Electric Cables—
L. Kilker & Co., Coventry "Kilker, Coventry" Coventry 1[illegible]
Johnson & Phillips, Ltd., Charlton Works, S.E.7 "Juno, London" Central 2[illegible] (6 lines)

Electric Lighting and Power—
F. Stanley Fardon, A.M.I.E.E., 10, Mosley Street, Manchester
Johnson & Phillips, Ltd., Charlton Works, S.E.7 "Juno, London" Central 2[illegible] (6 lines)

Electro Platers and Metal Polishers' Engineers—
W. Canning & Co., 15, 17, Great Hampton Street, Birmingham "Mecan, Birmingham" Birmingham 1[illegible]

Enamel—
Silico Enamel Co., New Cross, London

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edilcet, Phone, London" 3549 Victoria (3 lines)

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Flying Schools—
Bourne-cum-Aviation, Ltd., Tillicoultry, Bourne-cum-Hill "Tickles, Watson, Burneum-Hill"
Cambridge School of Flying and Aerodrome, 308, St. Andrews St., Cambridge "Cambon, Cambridge" Cambridge 5
Furniture (Office)—
Cooke & Dunhurst, 171, Dashwood House, London, E.C.
London Wall 573 and 6[illegible]

Galvanising—
Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851

Gauges—
J. A. Prestwich & Co., Northumberland Road, Tottenham, N.17

Gears—
Moss Gear Co., Ltd., Lionel Street, Birmingham "Moss, Birmingham"

Glue—
Improved Liquid Glues Co., Ltd., Gt. Hall Edge Street, E. "Cruelt" "Improglue, Wyon, London"
Moulds Co., 8, Arthur Street, E.C.4
Oldroyd, Wm., & Sons, Ltd., 9, Manchester

Goggles—
Triplex Safety Glass Co., Ltd., 14, Great Queen Street, Piccadilly, W.C.2 "Triplex, London"

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65, 68 & 69, Southwark Street, London, S.E. "Kinnell, London"

Hollow Spars—
McGruer Brothers, Hollow Spar Co., Ltd., Improved Wheel, Lyndall, Hollow Spar, Witton, Droitwich"
Robert Young's Construction Co., Ltd., Contractors' Works, Canonbury Street, Essex, London, N.1

Instruments—
British Wright Co., Ltd., 29, Clarges Street, W.C.2 Holborn

Instruments (Scientific, meters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge "Instrument, Cambridge" Cambridge 282
Short & Mason, Ltd., Makers of Scientific Instruments, Withamstow, E.17 "Short, Withamstow, London"

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch"



Motor Cars—
Arrol Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 284-5-6
Mann, Egerton & Co., Ltd., 39, 51, Conduit Road, London, N.W.1 "Mangerton, London"
Standard Motor Car Co., Coventry "Standard, Coventry" Coventry 539 (4 lines)

Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston on Thames
The Cragg Metal Engraving Co., Chiswick Works, North Rd. "Cragg, Chiswick"

Observation Panels—
Triplex Safety Glass Co., Ltd., 14, Great Queen Street, Kingsway, W.C.2 "Triplex, London"

Parachutes—
Lowe, Regent Street, W.
F. R. Lowe and Co., 44, Parnell, Ltd., 44, Shoe House, Lisson Street, London, N.W. "Shoemaniac, Ave, London" London Wall 3260 3267

Pattern Making—
Frith, Ward, & Co., 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743

Piston Rings—
Brown Bros. & Piston Ring Co., Ltd., Coventry "Brown, Coventry" Coventry 723

Plating, Nickel Silver and Electro Tinning
Arnold & Sons, Stand Co. Works, Lawrence Road, Tottenham, N.15 "Instruments, London." Tottenham 2370-1

Power Presses and Dies—
Bliss E. W. & Co., 24, Potosi, Street, Bethnal Green Road, London, S.E.1 "Blissdon, London" Hop 4310

Presswork—
Rubery Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345 (3 lines)
Bolton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich" Norwich 851
Ebors Propeller Co., 11 & 12, Sumner Place, Terrace, Kingston-on-Thames "Ebors, Kingston" Kingston 672
Integral Propeller Co., Ltd., "Airprop, Hyde, London" Hendon 9, Kingsbury 1[illegible]
Long Propeller, Ltd., Weybridge, "Aeroplane, Weybridge" Weybridge 340 341
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich "Motors, Norwich" Norwich 482 (3 lines)
Oddy, W. D., & Co., Leeds "Airscrews, Leeds" Central 291, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2 Clis 3[illegible]
Westland Aircraft Works, Yeovil Aircraft Yeovil" Yeovil 120
Pyrometers—
The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth, Letchworth 21

Rigging for Aircraft—
Cordoth & Co., Ltd., 4, Great Queen Street, London, W.C.2 "Cordoth, Wesdo, London" Gerrard 3[illegible]
Stanley Aviation Co., 67, Kingsland Road, E.2 Clis 3[illegible]

Rubber Tubing & Accessories—
Hancock, James, Expe., Ltd., 822, Old Kent Road, London, S.E. "Mechanic, London" City 3[illegible] and 3[illegible]

Safety Belts—
Short Bros., Rochester, & 82, Victoria Street, Westminster, S.W. "Tested, Phone, London" Regent 88

Screw-driving Machines—
Russell Bros., Redditch, Ltd., Littleworth, Redditch, Engineers, Redditch" Redditch 74

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345 (3 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 217
Mann, Egerton & Co., Ltd., Norwich Works, Norwich "Motors, Norwich" Norwich 482 (3 lines)
The Norman Thomason Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 38
Short Bros., Rochester "Seaplanes, Rochester" Rochester
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Hounslow 1537

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edilcet, Phone, London" 3549 Victoria (3 lines)
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxite, London, Phone" Willesden 2480

Seats for Aeroplanes—
Brewer, J. Arthur, Ltd., Works, 30, Park Lane, Leeds Central 1473

Shackles—
British Steel Piling Co., Ltd., Hounslow, Middx. "Golsil, Hounslow" Hounslow 254
The Rex Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rexmotac, Phone, London" Willesden 2480

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Tubes, Oldbury." Oldbury 211-14 (3 lines)
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345
Wm. Bisscoe & Co., Ltd., 51 and 52, Park Street, Birmingham "Brisk, Birmingham" Central 550
British Metal (Kingston), Ltd., Kingston-on-Thames
Gimbel & Co., 4 and 5, A.B. Row, Birmingham "Gimbel, Birmingham" Central 1223
London Aluminium Co., Ltd., Westwood Rd., Aston, Birmingham East 407 Birmingham
Rubery Owen & Co., Darlaston, South Staffs

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., 19, 20, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Victoria 4811
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London." Tottenham 2370-1
British Metal (Kingston), Ltd., Kingston-on-Thames
Gimbel & Co., 4 and 5, A.B. Row, Birmingham "Gimbel, Birmingham" Central 1223
Rubery Owen & Co., Darlaston, South Staffs
The Acetylene Corporation of Great Britain, Ltd., 19, 20, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Victoria 4811
The Shoe and Metal Engineering Co., Ltd., 6, Albemarle Street, Piccadilly, W.1 "Sebero, Phone, London" Regent 2181.
Arthur Hill & Co., 581, Seven Road, North Kensington, W. Park 1443

Shock Absorbers (Elastic Cord)—
Gimbel & Co., 4 and 5, A.B. Row, Birmingham "Gimbel, Birmingham" Central 1223

Small Tools—
The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosent, West-cent, London" Museum 2055

Sparking Plugs—
Lodge Sparking Plug Co., The, Rugby "Lodger, Rugby" Rugby 235
Rice, Lea & Co., Ltd. (Oho Plugs), 69, Pickett Street, W.C. "Rapine, Rug, London" Gerrard 2758

Springs—
Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 322
Gimbel & Co., 4 and 5, A.B. Row, Birmingham "Gimbel, Birmingham" Central 1223
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines)

Stampings—
Guthrie, J. B. & Son, 31, St. Mary Axe, E.C.3 Avenue 1432
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15 "Instruments, London" Tottenham 2370-1

Steel—
Allen, Edgar, & Co., Ltd., Imperial Steel Works, Sheffield "Allen, Sheffield" Sheffield 3607
Firth, Thos., & Sons, Sheffield, Firth Steel, Sheffield Sheffield 3230 to 3235
Guthrie, J. B., & Son, 31, St. Mary Axe, E.C.3 Avenue 1432
Neill, Bernard, & Co., Birmingham "Bernco, Birmingham" Smethwick 224

Steel Stamps and Markings—
Jas. Meadows & Sons, Cleveland Works, Cleveland Street, Mile End, E.1 "Davhur, Phone, London" East 3331 (2 lines)

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Tubes, Oldbury." Oldbury 211-14 (3 lines)

Taper Pins—
Mountford Tools, (Birmingham), Ltd., Tremo Works, Lifford, Birmingham "Tremo, Birmingham" Kings Norton 261-262

Tapes and Smallwares—
MacLennan, John & Co., 33, Newgate Street, E.C., and at Glasgow City 3115

Timber—
Engineering Timber Co., Ltd., 9, Victoria Street, London, S.W. "Hillsoil, Vic, London" Victoria 5073, 4210
Brown, R. P. & F. W., Wallaton Saw Mills, near Nottingham "Browns, Saw Mills, Wollaton" Nottingham 1256
J. Owen & Sons, Ltd., 104, Borough, High Street, S.E.1. "Bucheron, London" Hop 38 (2 lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark, R. Ingham & Co., Walter House, Bedford Street, Strand, W.C. "Pearline, Westrand." Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers—
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15. "Instruments, London." Tottenham 2370-1.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London" Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremill Musselburgh." Musselburgh 28
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 46 (3 lines)

Wirework—
Terry, Herbert & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 46
Sagar, J., & Co., Ltd., Halifax. "Sawtooth Halifax." Halifax 13
Wadkin & Co., Leicester. "Woodworker Leicester." Leicester 361

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.G.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

Telephone: 1153 and 1154, KINGSTON. Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

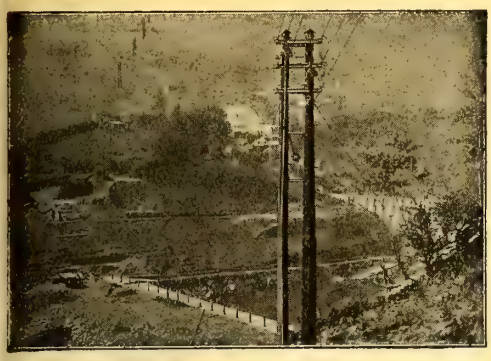
CONTRACTORS TO H.M. GOVERNMENT.

OFFICE AND WORKS—

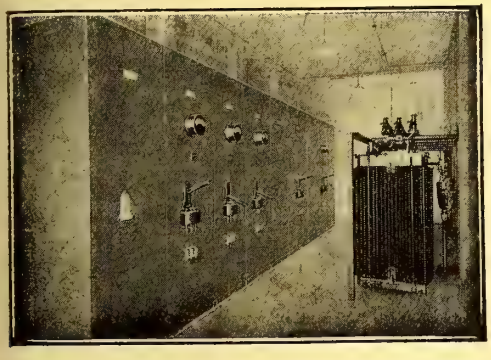
LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

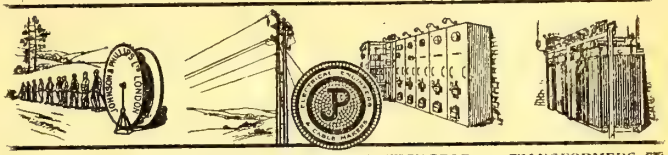


Electric Power Line.—Junction between Overhead and Underground Sections.



Switchgear and Transformers in Works Sub-Station.

SPECIALISTS IN ELECTRICAL TRANSMISSION AND DISTRIBUTION



CABLES OVERHEAD LINES SWITCHGEAR TRANSFORMERS etc

ELECTRIC POWER

Please send us your enquiries for any Cabling or Overhead Line Work, Switchgear, Transformers, Motors, Lamps or Wiring Accessories.

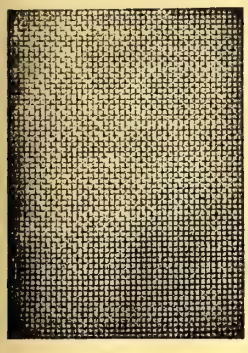
We are large Manufacturers of all such Plant and Material.

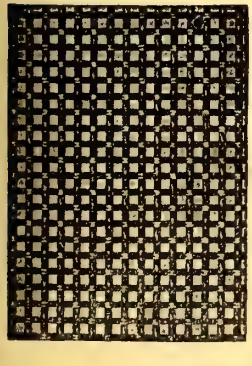
Complete Installations contracted for.

12, UNION COURT, OLD BROAD ST., LONDON, E.C.2.

JOHNSON AND PHILLIPS LTD
ELECTRICAL ENGINEERS & CABLE MAKERS
CHARLTON, LONDON, S.E.7.

BIRMINGHAM 106, Corporation St. | CARDIFF 9, Park Place. | GLASGOW 159, W. George St. | MANCHESTER 251, Deansgate | NEWCASTLE-ON-TYNE 44b, Blackett St. | PORTSMOUTH Cleveland Rd. Gosport





AIR BOARD STANDARD PETROL GAUZE—CONTROLLED BY THE AIR BOARD.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY

N. GREENING & SONS, LTD. ESTABLISHED 1790.

LONDON WAREHOUSE—

16 FINSBURY STREET, E.C.2.

Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No. LONDON WALL 1082.

WORKS - WARRINGTON.

Victory

In concentrating to achieve a common victory in a common cause, we are acquiring knowledge infinitely valuable in the battle of commerce which will follow Peace.

Better organization, better machinery, better workers will result in the more expeditious production of a thousand and one requirements in the process of reconstruction.

And that indeed is another victory of infinite value to British interests both at home and overseas.

In our own case these facts are emphasized, and because we know the magnitude of our facilities we desire to get in touch with others like ourselves who are looking forward, and whom we can help in the huge production of Repetition Parts.

SUCKLING

Wm Suckling & Sons

KINGSWAY HOUSE, ALBION ST., BIRMINGHAM.

LONDON: MORLEY HOUSE, HOLBORN VIADUCT :: E.C.1.

M

ALL-BRITISH

M-L

MAGNETOS

THE main features of "M-L" All-British Magnetos are great reduction in size and weight as compared with pre-war magnetos of the same electrical output, effective sparking at very low speeds and strict interchangeability—permitting prompt supply of spares.

The M-L Magneto Synd., Limited
Victoria Works, Coventry

At your Service after the War

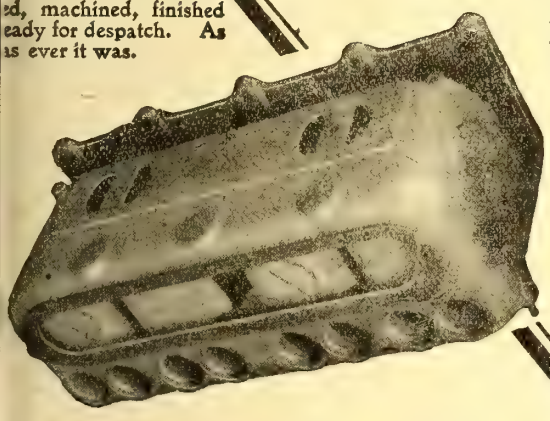
or the expert eatment of **Damaged Cylinders** send to the cylinder repair specialists.

Broken feet, cracked water jackets or valve seatings, smashed heads, scored or oval bores, or any other repair.

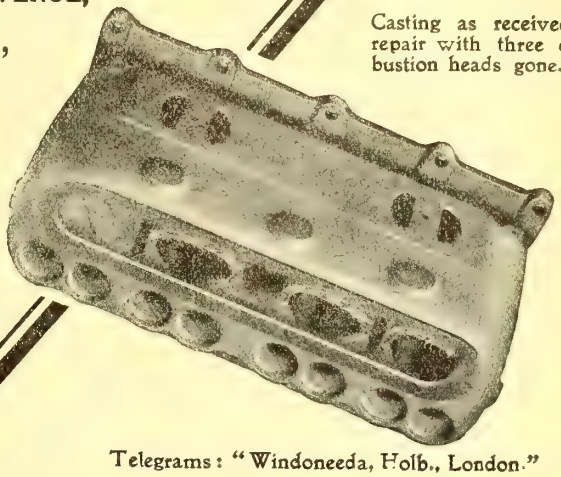
THE NEW WELDING CO.

26, ROSEBERY AVENUE,
LONDON,
E. C.
1.

ed, machined, finished eady for despatch. As as ever it was.



Casting as received for repair with three com bustion heads gone.



Telephone: 5252 Holborn.

Telegrams: "Windoneeda, Holb., London."

SAMUEL MERCER & CO.,

Telegrams RECONCILED CANNON, LONDON

Proprietor—S. T. MERCER.

Telephone: CITY 6342.

Metals

MILD STEEL SHEETS SPECN. S3 & 9A. Passed & Stamped A.I.D.

BEST CHARCOAL TINNED & LEAD COATED.

BLACK C/R and C/A SHEETS.

GALVD. SHEETS.



for Aircraft.

BRASS AND COPPER SHEETS.

SOLDER. INGOT TIN.

WELDING WIRE.

COPPER BITS, ETC.

LARGE STOCKS IN OUR OWN WAREHOUSE.

Immediate

Manufacturers of Solder

Deliveries.

for all purposes.

198, UPPER THAMES ST., LONDON, E.C.4.

CONTRACTORS TO THE AIR COUNCIL.

ESTABLISHED 1912

The SUPERMARINE Aviation Works, Ltd.

DESIGNERS & CONSTRUCTORS OF **FLYING BOATS.**

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. SCOTT-PAINE, Director & Gen. Manager.

Offices, Works, & Flying Waters—
SOUTHAMPTON, Eng.

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

TWO COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE

Addresses of our fine Saw Mills, Works, etc.,
— have been camouflaged by the Censor. —

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

INCREASED OUTPUT
DEMANDS
GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

The Wilfley Company, Limited
SALISBURY HOUSE, LONDON WALL, E.C. 2.

Telegrams : " Wrathless, Phone, London." Telephones : City 2681 & 2682.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

W. CANNING & Co.

Lustre Works, Gt. Hampton Street.

And 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

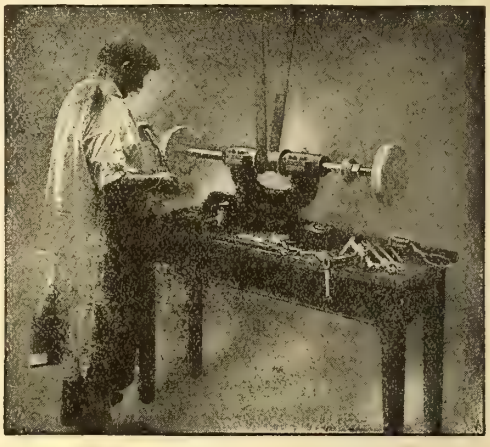


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON

CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office and Works:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 46 7 4648 HAMPSTEAD.

Scottish Factory and Aerodrome:

ALLOA.

Cable and Telegraphic Address: "CAUDROPLAN, ALLOA." Phone: 52.

tubes of 1.75 millimetre thickness, and 45 mm. outer diameter. The plane ribs show the usual construction of most British air craft.

There are no compression struts between the spars, some of the ribs being solid struts instead.

The interior wiring of the planes between the body and the struts is carried out in simple profile wire, that of the overhanging ends of thick-ended wire.

A wood strip forms the back edge of the planes. Further, two auxiliary ribs ranging from the leading nose edge to the main spar are arranged between each two ribs.

The fabric is sewed together with the ribs, and is painted yellow below, browned above, as is the fabric of the body. Shoe-eyes are arranged on the underside of the trailing edge of the plane to assess the pressure.

The centre section struts are covered steel tubes. The plane spruce struts rest in long stampings, serving as fixing points of the vertical wiring.

Profile wire is employed for the plane cross wiring with twin wires for those carrying load and single for the counter ones.

The two spars of the upper planes are strengthened further between the centre section and the struts with two wires each. Unbalanced ailerons are hinged to the back crossbar of the upper and lower planes.

The body shows the usual strut cum wire combination, being rounded above with half-circle frames and fairings, and having three-ply wood planking of 4 millimetre thickness to the pilot's seat. Fuselage longitudinals and struts have sections of I-shape, except the vertical struts behind the pilot's seat, which are worked out round.

The tail-plane is curved to both sides and fixed to the body, so that the angle of incidence can be varied during the flight within the limits + 4.5 deg. and — 3 deg. To this end the front spar is turnable, while the rear spar, with its wiring, is fixed to a tube, arranged shiftable to the body stern post. This tube rests with a piece of thread in a gear-nut, again resting in the stern-post fixed, yet turnable.

When the nut is turned from the pilot's seat by means of wheel and cable, the tube is displaced upwards or downwards, transferring thereby the same manœuvre on the rear spar of the tail-plane, and thus its angle of incidence changes.

The elevator hooked to the fixed tail-plane partakes in this movement. The wires for operating the elevator are led through the body and tail-plane, which certainly saves air resistance, yet makes twice a 20 deg. direction change of each wire necessary. Main and tail-planes are equipped with cellon windows, rendering a control of the rollers possible.

The under-carriage shows the normal form. The through-running axle rests between two auxiliary ones. There is no limit of the springing range.

The tail skid shows an unusual construction, being arranged turnable behind the stern post and connected with the rudder cable by intermediance of springs. A brass skid bow is sprung by means of two spiral pressure springs which are prevented from sideway turning by inserted telescope tubes.

According to the firm's sign board the Wolseley-Hispano-Suiza engine gave the 30th August, 1917, on brake 206 h.p. = 203 P.S. at 2005 revolutions. The r.p.m. of the four-bladed airscrew is geared down in the ratio of 4 to 3.

The exhaust gas is led behind the pilot's seat in two tubes to each side of the body. The motor sits so that there is free accessibility after removing the bonnet. The radiator forms the bow of the body.

A cover arrangement makes it possible to uncover the body about half way from the pilot's seat.

The main petrol tank of 120 litres' capacity is placed behind the motor on the upper fuselage longitudinals. A gravity tank of 17 litres capacity is arranged in the centre section between the leading edge and the main spar. The oil tank of a capacity of 14 litres lies cross in the engine frame below the rear edge of the motor.

The fuel suffices for a flight of about two hours' duration.

Following instruments are arranged in the pilot's seat:—

To right: A box for the light pistols; a contact breaker for the self-starter; a contact breaker for the two magnetos; a triple led cock for the gravity and pressure petrol; a triple led cock for the hand and motor air-pump; a thermometer for the water of the radiator; the petrol gauge placed on the back side of the main tank, and a manometer for air-pressure.

To left: Gas lever; lever for regulation of the gas in altitude flights; lever for operating the radiator blinds, clip for three light cartridges. On the bottom is further arranged a hand-pump for the hydraulic machine-gun gear; two boxes for drums for the movable machine-gun and the self-starter.

A square windshield of Triplex glass is placed in front of the pilot's seat. Behind it a box is arranged in a queer position to the body with access from outside.

The fixed Vickers' machine-gun lies to left of the pilot inside the body fabric. The cartridge girdle is of metal. The firing of the machine-gun takes place hydraulically by means of a control arrangement, placed in front of the motor and connected with the machine-gun through a copper main, as well as driven from the air screw by a gear set. The firing lever sits on the stick.

On the bow-shaped iron band lying on the centre section rests a Lewis gun, which can be pulled down during the flight to permit vertical firing.

The empty weight of the aeroplane was worked out at 706 kilos, distributed as follows:—

	kilos.
Engine	225.0
Exhaust collection	12.0
Self-starter	3.6
Radiator	23.8
Radiator water	31.0
Air screw	26.6
Main petrol tank	17.8
Gravity petrol tank	6.5
Oil tank	3.9
Motor equipment	6.4
Body with seat and plate covers	151.0
Tail-plane angle of incidence change arrangement	1.9
Under carriage	40.8
Tail skid	3.7
Pilotage arrangement	5.4
Planes with wiring	112.2
Vertical and horizontal wiring	21.0
Body equipment	14.0
	706.0

The fuel weight amounts with fully loaded tanks to 111 kilos., so that the total useful load can be calculated at 250 kilos., the total weight working thus out at 956 kilos.

The load of the planes is thus: $\frac{956}{22.8} = 42$ kilos per square metre.

The performance load is then: $\frac{956}{200} = 4.78$ kilos per horse-power.

THE AERONAUTICAL SOCIETY.

Mr. W. W. Hackett will give a lecture on "Tubing" before the Aeronautical Society on Thursday, May 2nd, at 7.30 p.m., at the Royal Society of Arts. Lt.-Col. R. K. Bagnall-Wild, R.E., will preside.

THE CHAIRMAN OF THE SUNBEAM CO.

Owing to the recent death of Alderman John Marston, J.P., at over four score years, the chairmanship of the Sunbeam Motor Car Co., Ltd., which he founded at the beginning of the century, became vacant.

At the last meeting of the Board of Directors, Mr. Thomas Cureton, hitherto Vice-Chairman of the Company, was elected to succeed to the office. This measure is a continuance of the tradition of the firm inasmuch as Mr. Cureton was chiefly responsible for causing the late Alderman John Marston to embark on the motor industry by the establishment of an entirely separate company in Villiers Street, Wolverhampton.

Mr. Cureton was the first Managing Director of the Company, and steered it through all the inevitable difficulties of a pioneer enterprise, holding that office right up to November, 1914, at which period the Company had passed successfully from peace-time production to war work.

Mr. Cureton's business career has always been associated with the late Alderman John Marston, to whom he was apprenticed in 1877, his ability being so marked from the outset that before he was 21 his "articles" were given back to him and he was treated as a grown man, being left in charge of a factory, which, in those days, was of appreciable proportions, employing three hundred hands.

A pioneer cyclist in the "high" bicycle days, Mr. Cureton had a good deal to do with inducing Alderman John Marston to take to the making of bicycles, and later both of them became equally keen on realising the possibilities of motor traction. Mr. Cureton, incidentally, was responsible for enlisting the services of Mr. Louis Coatalen, Chief Engineer of the Sunbeam Motor Car Co., Ltd.

AN ASCOL MILESTONE.

The Aircraft Supplies Co., Ltd., of 125, Long Acre, W.C.2, has already established a large connection in Birmingham and the surrounding Counties, but the expansion of Ascol Service is so rapid that the company has taken new offices at 54a, International Exchange, Edmund Street, Birmingham, which have been fitted up under the direction of the Brothers Serin.

Mr. L. J. Serin has represented Ascol House for some time in that district, but customers' wants have outgrown the possibility of the "Personal Touch" which he has established over a wide radius. Consequently, his brother, Mr. A. M. Serin, has left the important position he held at Ascol House, London, to assist in covering the Birmingham District and giving closer personal attention to clients.

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—V.

BY C. SYLVESTER.
Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Gudgeon-Pins.

The gudgeon-pin may be said to be one of the most important parts of the internal combusion engine, since the movement of the connecting-rod is swinging and not rotary.

As stated in previous remarks, the pin is situated in, or near, the centre of the piston. In special cases, however, it is placed a little higher, the advantage of this being that a longer connecting-rod may be fitted without increasing the height of the engine. This merely refers to oil or gas engines where the connecting-rod is fitted to a piston-rod.

In aero-engine construction, gudgeon-pins are made of chrome nickel steel, bored hollow and hardened.

With reference to the dimensions of gudgeon-pins, it may be said that the pin is subjected to a bending moment of :—

$$\frac{Ph \times L}{4}$$

That is, where Ph equals the pressure on the cylinder head, and L is the total length between the centres of support. This is where pins are not exactly a tight fit.

When the pin is a tight drive into the piston, the bending moment may be taken as :—

$$\frac{Ph \times L}{6}$$

Gudgeon-pins may be tapered or parallel according to design. Parallel pins should be securely locked by means of circular springs let into a recess machined in the piston, or special springs may be fitted to prevent any lateral motion of the pin when it is fixed in position.

The diameter of pins vary according to the distance between the centres of support. In these calculations, hollow and solid pins have also to be taken into consideration, for in the case of hollow pins the portion bored out must be deducted because the moment of inertia is somewhat different. Otherwise, the calculations are the same.

As a guide to the diameters and clearances one quotes the dimensions of the gudgeon-pin used in a 160 B.H.P. Beardmore Aero-Engine.

Diameter of pin, 28 mm.
Fit of pin in piston, 28 mm. driving fit.
Fit of pin in small-end bush of connecting-rod. Minimum and maximum clearances, .002 in. and .004 in.
Float of connecting-rod on pin between piston bosses, 10 mm.

Connecting-Rod Design.

There is a considerable difference of opinion among designers concerning connecting rods. This may be understood when one considers that some designers are continually employed upon one class of work and very rarely touch upon other work. The result is that we see some engines with rods varying in length from four to six times the length of stroke, and even in small gas engines 2.5 times the length of stroke is not very uncommon.

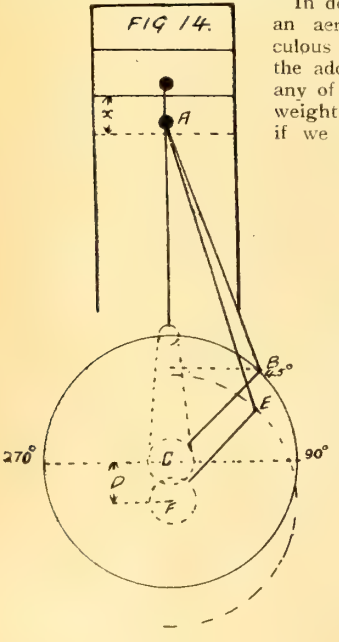


FIG 14.

In designing a connecting-rod for an aero-engine it would be ridiculous to consider, for one moment, the adoption of a connecting-rod of any of the above proportions. Here weight is the first consideration, and if we use as short a connecting-rod as is possible (providing of course that the obliquity is not so great that the side thrust becomes excessive) we may consider that the case is met.

Over and above all the outstanding features in connection with the design of connecting-rods it should be remembered that where long rods are used, in addition to the extra expenditure on material and labour for their production, the material must be of a much larger cross section so as almost to eliminate the bending stresses.

These stresses exist in every connecting-rod no matter on what type of engine they may be used. Thus, the rods used for aero-engines may be much shorter and lighter without approaching too near to the safety limits or exceeding reasonable bending stresses.

Minimum Lengths of Connecting-Rods.

Apart from the necessary mechanical strength, and ignoring the modulus of elasticity, the minimum length of connecting rods depend upon : The length of stroke and the height of the cylinder base from the top of the crank.

A glance at Fig. 14 will make this clear. Here we see a single cylinder, piston, connecting-rod and crank. Now, if we follow the outside of the circle of which the centre of the crank is the radius, it is clear that the maximum horizontal travel of the connecting-rod in one revolution is between the 90 and 270 degree points respectively.

We will now consider the position when the crank is on the 45 degree point, that is, if the length of stroke is twelve inches the piston will have moved X inches in a downward direction in the cylinder. In this case the position of the piston, rod, and crank will be as indicated by the lines A—B—C. When in this position there should be a clearance of at least 3 m/m to allow for the expansion, bending stresses, and whip of the rods when the engine is under full load.

In the diagram is shown purposely the connecting-rod touching the cylinder wall. If, however, we increase the distance between the centre of the crank and the base of the cylinder by the distance D, then, the position of the piston, road, and crank will be as indicated by the lines A—E—F. The alteration of crank and piston centres will, of course, necessitate a longer connecting-rod. This in turn calls for an increase in the cross sectional area of the rod, but this cannot be avoided as the minimum length of rod is now obtained.

Connecting-Rod Construction.

Connecting-rods for aero-engines are manufactured from forgings of a special air-hardening chrome nickel steel which, after being heat treated, has a tensile strength of about 280,000 pounds per square inch. They are machined and milled from the solid to an H section, and are very strong and light.

In Fig. 15 is illustrated a connecting-rod without bearings. Among other dimensions is shown the cross sectional area of a rod used on a 180 B.H.P. aero-engine : (a) 13.5 in., (b) $3\frac{1}{8}$ in., (c) $1\frac{1}{2}$ in., (d) $1\frac{5}{8}$ in., (e) $\frac{7}{8}$ in., (f) $1\frac{3}{8}$ in., (g) $\frac{3}{4}$ in.

The minimum and maximum thicknesses of these rods, at any point of the H section is $\frac{1}{8}$ and 3/16 of an inch respectively.

Connecting-Rod Bearings.

Gun metal is an excellent material to use for connecting-rod bearings. The "big-end" bearing is lined with Dowrance's

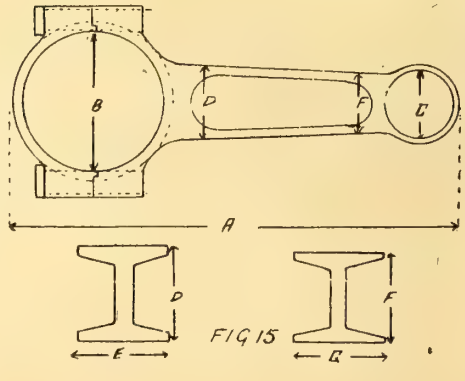
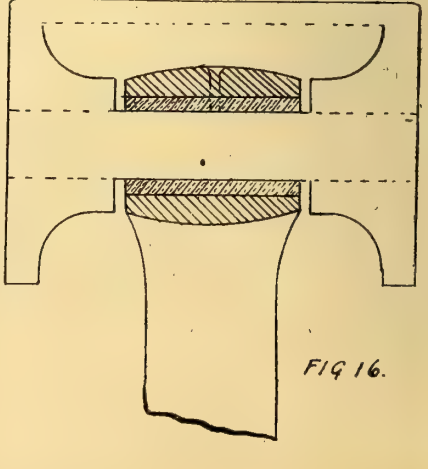


FIG 15


FIG 16.


CELLON
— NON-POISONOUS —
DOPE
CELLON, LTD.,
22, Cork Street, W.1.
Telephone: Gerrard 440 (2 lines).
Telegrams: "AJAWB, Reg, London."
S.B.O.A.C.
CELLON WORKS
GEOFFREY WATSON

or Babbit's metal, and should be a very neat fit in both lateral and diametrical positions on the crank.

There are no outstanding features in the design of connecting-rod bearings, except perhaps the methods of fixing them in the connecting-rods. There are several methods of doing this, dowel pins being favoured by some manufacturers while others prefer to fix the big-end bearings by means of the bolts which hold the two halves of the bearing together.

When the latter method is adopted, the sides of the bearing, where the bolts pass through the two halves, are grooved sufficiently long to prevent the bearing from turning.

The bearings for the small ends of connecting rods, which are almost always merely annular bushes, are made of gun-metal but are not lined with anti-friction material. In some cases the bush is a neat fit but is free to move laterally, in other cases the bush is merely pinned to the rod.

Considerable care must be taken in the boring and fitting of the bushes in the small ends of connecting-rods. If this is not done, it will not be possible to obtain a perfect alignment of the bush and the gudgeon-pin bush.

Fig. 16 illustrates the small end of a connecting-rod fitted on a gudgeon-pin in a piston.

Here the bush is shown pinned to the connecting-rod, the pin being fixed in the extreme end of the rod. Fitting the pin in this position does not interfere with the mechanical strength of the rod, for this part is subjected to the minimum amount of strain at any time.

Dimensions of Bearings.

There are no rules laid down for determining the dimensions of connecting-rod bearings. The diameter of the big and small ends is decided by the size of the crank and gudgeon-pin. The lateral length should be as large as possible.

In aero-engine design there is a tendency to make the length of big end bearings as short as possible. This is certainly bad practice and should be avoided.

The writer has had considerable experience with bearings of all types of internal combustion engines. In practice he has found that the length of the bearings should be as long as the mechanical strength of the crank will allow, and that the minimum length should not be less than the diameter of the shaft. That is, a crank having a diameter of three inches should have a bearing the minimum length of which should not be less than three inches.

(To be continued.)

HOW AN AEROPLANE IS BUILT.

A hand-book entitled "How an Aeroplane is Built," by Stepney Blakeney, has been published by The Aeroplane and General Publishing Co., Ltd., which it is hoped will fill the wants of various classes of people.

Regular readers of The Aeroplane will recollect that a series of articles on practical aeroplane construction appeared in The Aeroplane written by Mr. Blakeney, and various readers asked that they should be reprinted in book form.

The articles did not, and the book does not, profess to be a learned dissertation on factory methods, nor a series of hints and tips on aeroplane construction. It is intended to show in the simplest possible language the way in which a smallish firm, suddenly turned on to produce aeroplanes of an ordinary standard type, might set about the job with reasonable prospects of success.

In these days there are hundreds of thousands of men and women engaged in making aeroplane parts Very few of them know whereabouts in an aeroplane the part on which they are working is intended to go, or what it is intended to do when it gets there. Yet many of them would like to know, and would take a keener interest in their work if they understood the why and wherefore. This book will give such intelligent people a fair understanding of the reason for their work and of its importance in the complete aeroplane.

In drawing offices also there are many hundreds of fairly well educated men and women who, though they may be excellent hands at drawing and tracing, have no opportunity of going into the workshops and seeing how the work is done to their drawings, or of seeing what the finished component part looks like before it is put into its place in the machine.

Many of them, indeed, are so new to aeroplane work that they could not even locate in a general arrangement drawing the precise place where the component part which they have been drawing is intended to fit. They merely work to instructions, without intelligent appreciation of the reasons for those instructions.

Such people, also, will be able to acquire from Mr. Blakeney's description an all-round idea of how the parts of an aeroplane are made, and how they come together to form a complete machine, and it is hoped that this knowledge will help them to find their work more interesting.

Over and above the people in aircraft factories there are many thousands of others who are keenly interested in aeroplanes, and who, having a natural liking for things mechanical, are anxious to know by what general methods so much timber and metal is turned into a modern flying machine. These seekers after information will find in this book a simple and easily understandable account of the whole process of manufacture, from the rough plank and the metal sheet to the complete aeroplane ready to make its trial flight.

One believes, also, that in these days when every youngster at school desires to become an aviator, just as in our young days we aspired to be engine-drivers—motor-cars and aeroplanes being then undiscovered—Mr. Blakeney's simple descriptions of the various workshop processes which go to make an aeroplane will be highly appreciated by school-boys of the age at which they begin to study the motoring and flying papers.

It must not be thought that Mr. Blakeney's imaginary workshop represents the last word in the development of aircraft factory development. It is, as he points out, a small shop employing a hundred hands or so, and he has laid down its organisation so that it may be capable of expansion to any extent desired. It stands, in fact, in the safe middle position between the old aerodrome shed in which we used to build our aeroplanes some seven or eight years ago, and the kind of aeronautical sausage factory which will produce the Aerial Fords of the future. Therefore the digestion of the book may be regarded as an easily comprehensible undertaking for any intelligent person who is keen on aeroplanes, and who wants to learn in a general way how they are produced.

With regard to Mr. Blakeney's qualifications to write on the subject of aircraft construction, it is interesting to note that he spent 20 years as a railway engineer during which time he acted as constructional engineer as well as a workshop manager. He is a first class practical mechanic, and is capable of performing any job himself with the overseeing of which he is concerned.

Early in the war Mr. Blakeney left railway work and went to a well-known aircraft factory where he laid down the machine tools in a new machine shop; designed, bought the material for, and superintended the erection of a whole new section of the works; reorganised the whole output, and raised it to a rate which had never been thought possible, and generally did the firm much good. Since then he has been to certain other firms, each job being a step upward in responsibility, and at each he has added to his knowledge of the problems of organising an aircraft factory, for at each he has had to evolve order out of chaos.

While the articles were running in The Aeroplane, letters were constantly coming in from people in all classes, from managers of works who had recently been turned onto aircraft production, from mechanics, from women munition workers of the better class, from draughtsmen, and from school-boys, all anxious to know whether, and if so when, the series would be published in book form. It is now at their disposal, revised in detail, with fresh drawings, and many more of them, by Mr. Geoffrey Watson, one of the most accurate and descriptive of aircraft artists.

The book is bound in cloth and contains 233 pages, and is thoroughly good value for the price, namely, 5s. Copies can be obtained from The Aeroplane and General Publishing Co., Rolls House, Breams Buildings, E.C.4, price 5s. 4d. post free.

A CHANGE OF ADDRESS.

It should be noted that the address of Cellon, Ltd., the proprietors of Cellon Dope, has been changed to 22, Cork Street, London, W.1, and all correspondence should be addressed accordingly.

FLAX SUPPLIES.

Over 4,000 applications have been received from City workers in response to the invitation to spend their holidays assisting with the flax harvest, which is of the greatest aircraft importance.

Railway fares to camps in Yorkshire and Lincolnshire, with food and accommodation, will be provided free, and there will be a payment of from 8s. to 10s. a week From the middle of May until the end of August it is estimated that about 10,000 volunteers will be needed.

Applications should be made to Captain Elgee, N.S.R., Salters' Court, St. Swithin's Lane. E.C.

A CHANGE OF ADDRESS.

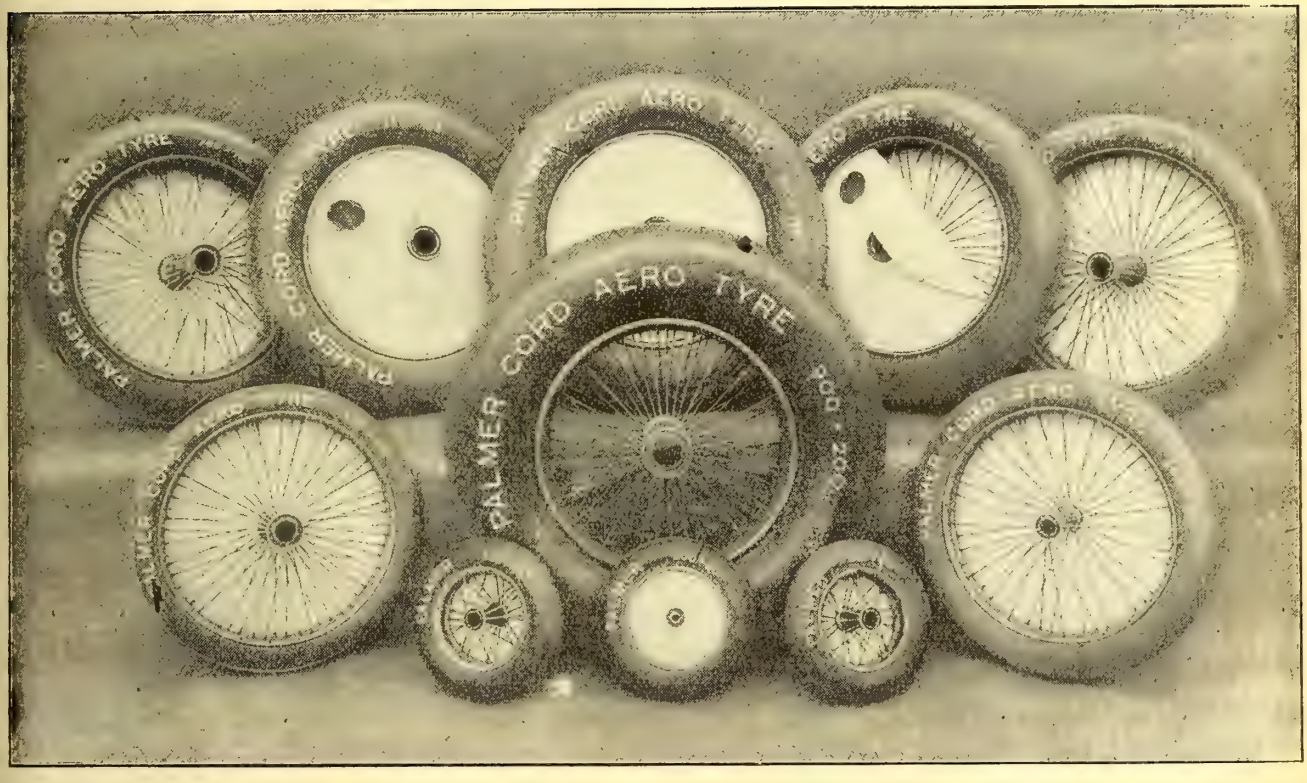
It should be noted that the registered offices of the Regent Carriage Co., Ltd., aeronautical and automobile engineers, have now been transferred from Graham Street to 126-132, New King's Road, Fulham, S.W.6, and all correspondence should be addressed accordingly.

A VACANCY.

A vacancy exists in the Advertisement Department of The Aeroplane for a capable woman Stenographer, who has had previous experience. Accurate shorthand and type-writing are essential, but a high standard of general education is equally important. Applications should be made by letter only to Mr. J. F. Atkinson, The Aeroplane, 166, Piccadilly, W.1.

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×100	33	150.	38.09	Central	800×150	†41	185.	55.	Central
,,	17	72.39	12.7	Central	,,	77	178.	44.45	132/46	,,	82	185.	55.	135/50
450×60	30	89.	31.75	Central	,,	92	185.	55.	135/50	,,	85	185.	55.	Central
575×60	21	160.	28.	Central	,,	95	185.	55.	Central	,,	106	185.	47.62	135/50
,,	34	150.	31.75	104/46	,,	96	178.	55.	132/46	,,	†205	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	99	178.	38.89	132/46	1000×150	97	250.	65.4	Central
650×65	78	178.	44.45	132/46	,,	112	150.	40.	Central	,,	102	185.	55.	125/60
,,	79	178.	44.45	Central	650×125	119	178.	55.	132/46	,,	201	185.	60.32	125/60
,,	100	178.	38.09	132/46	750×125	33	150.	38.09	Central	900×200	107	185.	55.	Central
,,	101	178.	31.75	132/46	,,	77	178.	44.45	132/46	,,	108	185.	55.	125/60
600×75	21	160.	28.	Central	,,	92	185.	55.	135/50	,,	120	185.	66.67	125/60
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	208	185.	60.32	125/60
700×75	78	178.	44.45	132/46	,,	99	178.	38.89	132/46	1100×200	52	185.	55.	116/69
,,	79	178.	44.45	Central	,,	112	150.	40.	Central	,,	57	185.	55.	Central
,,	100	178.	38.09	132/46	800×150	†36	185.	55.	135/50	,,	203	185.	60.32	116/69
,,	101	178.	31.75	132/46	,,	†40	185.	60.32	135/50	,,	204	185.	60.32	Central

†*Wheels Nos.* 36, 40 41, *and* 205 *are of stronger type than the other wheels for* 800 x 150 *tyres.*

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane, from the current Official Patents Record :—

Patent Applications.

Adams, W. C. Aeroplanes and aircraft. No. 6479. April 17th.
Austin Motor Co. Means for absorbing vibration in the drive between aircraft engine and propeller. No 6647. April 19th.
Avery, F. L. Aeroplanes, etc. No. 6343. April 15th.
Avorio, L. Kite balloons. No. 6379. April 15th.
Avorio, L. Kite balloons. No. 6402. April 15th.
Baker, L. E. Means for indicating height from the ground of aircraft about to land. No. 6440. April 16th.
Bernard, D. H. Bombs. No. 6576. April 18th.
British Aircraft, Ltd. Aeroplanes, seaplanes, etc. No. 6400. April 15th.
Broome, J. H. Clinometers for aircraft, etc. No. 6484. April 17th.
Brown, A. Propeller blades of aircraft, etc. No. 6634. April 19th.
Caproni, G. Construction of aeroplanes. No. 6720. April 20th.
Cook, C. W. Aeroplane fuselages, etc. No. 6590. April 18th.
Cordner, J. Aircraft. No. 6703. April 20th.
Davies, R. L. Gun and projectile for aircraft. No. 6328 April 15th.
Downes, A. J. Determination of probable position of aeroplane, etc., after given interval of time. No. 6480. April 17th.
Downes, A. J. Determination of position and charting of course of airship, etc. No. 6481. April 17th.
Fenston, J. Aircraft. No. 6581. April 18th.
Fraser, F. A. Clinometers for use on aircraft and submarines. No. 6336. April 15th.
Hetherington, H. W. Flying machines. No. 6391. April 15th.
Kemp, J. R. Clinometer for aircraft. No. 6385. April 15th.
Kupec, G. Flying bombs. No. 6488. April 17th.
Leech, A. Aeroplanes. No. 6516. April 17th.
Long, F. C. Method of defence against aircraft. No. 6464. April 16th.
Magrath, W. T. Device for indicating speed of aeroplanes, ships, motor-cars, etc. No. 6557. April 18th.
Malam, J. Aeroplane. No. 6345. April 15th.
Minvalla, P. E. J. Parachutes. No. 6443. April 16th.
Naylor, J. Means for indicating angle of aeroplanes in flight. No. 6559. April 18th.
Page, F. H. Aeroplanes, etc. No. 6684. April 20th.
Power, R. F. Brakes for aircraft. No. 6359. April 15th.
Power, R. F. Brakes for aircraft. No. 6360. April 15th.
Sclater, A. W. Aeroplanes, etc. No. 6620. April 19th.
Verner, J. F. Aeroplane controls. No. 6455. April 16th.
Vickers, Ltd. Mooring of lighter-than-air aircraft. No. 6533. April 17th.
Whetton, S. C. Aeroplane levels or clinometers. No. 6431. April 16th.

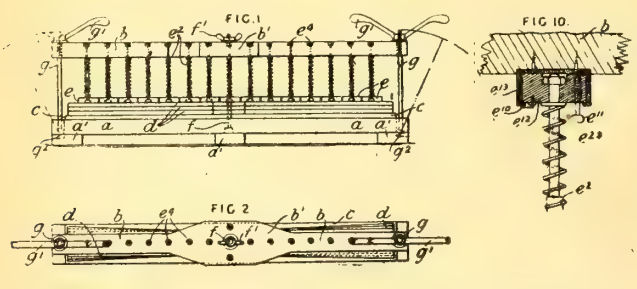
Complete Specifications Accepted, prints of which can be obtained on and after May 9th, 1918.

106,092. March 24th, 1916. Fortescue, A. J. Aerial machine of the heavier than air type.
114,724. June 22nd, 1917. Miller, A. R. Level indicator for aeroplanes and the like.
114,798. Oct. 27th, 1917. Soc. Anon. des Etablissements, L. Bleriot. Radiators for explosion engines.

Abridgments of recently published Specifications.

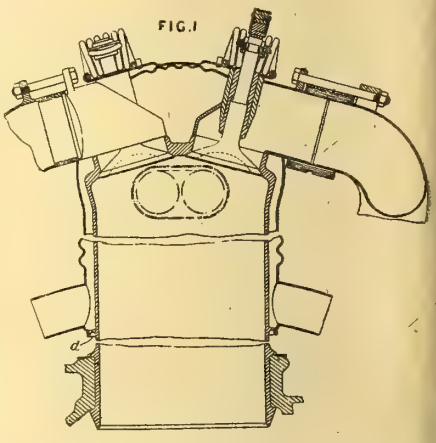
113,354. Cramps; glueing. Hamilton, D. G., 23, Naylor Road, Whetstone, London.

A cramp for use in glueing together laminæ for the manufacture of screw propellers for aircraft and like laminated devices,



comprises a base and a presser-bar provided with a series of spring pressing-feet for pressing the work down onto the base, and means for depressing the presser-bar. As shown in Figs. 1 and 2, the base *a* is a movable one adapted to rest on a bench, etc., and is provided with feet a^1. The laminations *d* to be glued together are placed on a plate or carrier *c* laid loosely on the base *a*. The presser-bar *b*, which has a central enlargement b^1, carries a series of spring feet *e*, or they might be actual springs, which rest on the work *d*, and pressure is applied by cams or screws, etc., such as rods *g* pivoted at g^2 to the base, and provided with pressure-applying nuts, etc., g^1. An additional pressure bolt *f*, f^1 is shown at the centre of the propeller boss. The pressing-feet *e* are shown carried by rods e^2, the heads of which are in recesses in the undersides of the feet, springs being placed on the rods e^2 as shown. The rods e^2 pass through holes in the bar *b*, and are provided with nuts e^4 on their upper ends. The base *a* may form part of a bench or other fixed structure instead of being separate and movable as shown. The feet *e* are shown in Fig. 2, placed in line along the centre of the bar *b*, and on each side of the central bolt *f*. When it is desired to set off some of the feet *e* from the general line they may be mounted adjustably on the bar *b*. Fig. 10 shows an arrangement in which the rod e^2, e^{2*} carrying the foot is telescopic, and its upper end is fixed in the block e^{12} slidable in a transverse guide e^{13} fixed on the underside of the bar *b*. A pointer e^{10} on the block e^{12} moves over an index on one of the flanges of the guide e^{13}, and a set-screw e^{11} fixes the block when adjusted. In a modification, the telescopic rod e^2, e^{2*} is carried by an arm pivoted on the underside of the bar *b*, an index and fixing screw being provided for adjusting the position of the rod and its foot.

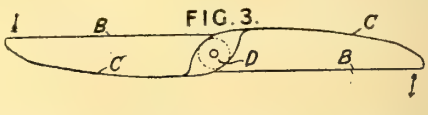
113,406. Internal-combustion Engines. Salmson, E. J. J., 9, Avenue des Moulineaux, Billincourt, France, and Dudbridge Ironworks, Ltd., Stroud, Gloucestershire.



Cylinders, Cooling. — A dome-shaped sheet-steel water jacket is welded to a flange *d* on the cylinder barrel and to the parts on the cylinder head that project through it; it is corrugated between these parts. The jacket is divided on a horizontal plane into two parts which are welded together.

113,463. Aerial Propellers. Nosworthy, W. H., 55, Fenwick Road, East Dulwich, and Prescott, S. J., 45, Church Street, Camberwell, both in London.

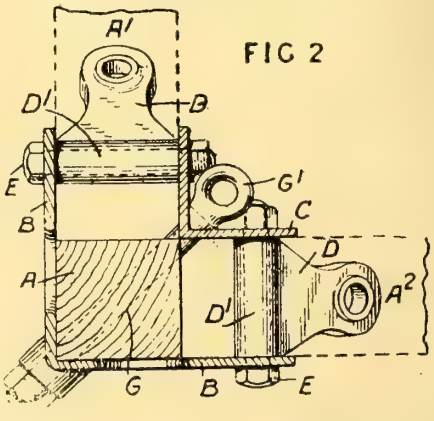
An aerial propeller is designed so that its revolution space figure approximates to a rotating knife, which is thin or sharp at the edge or circumference, and which thickens gradually to



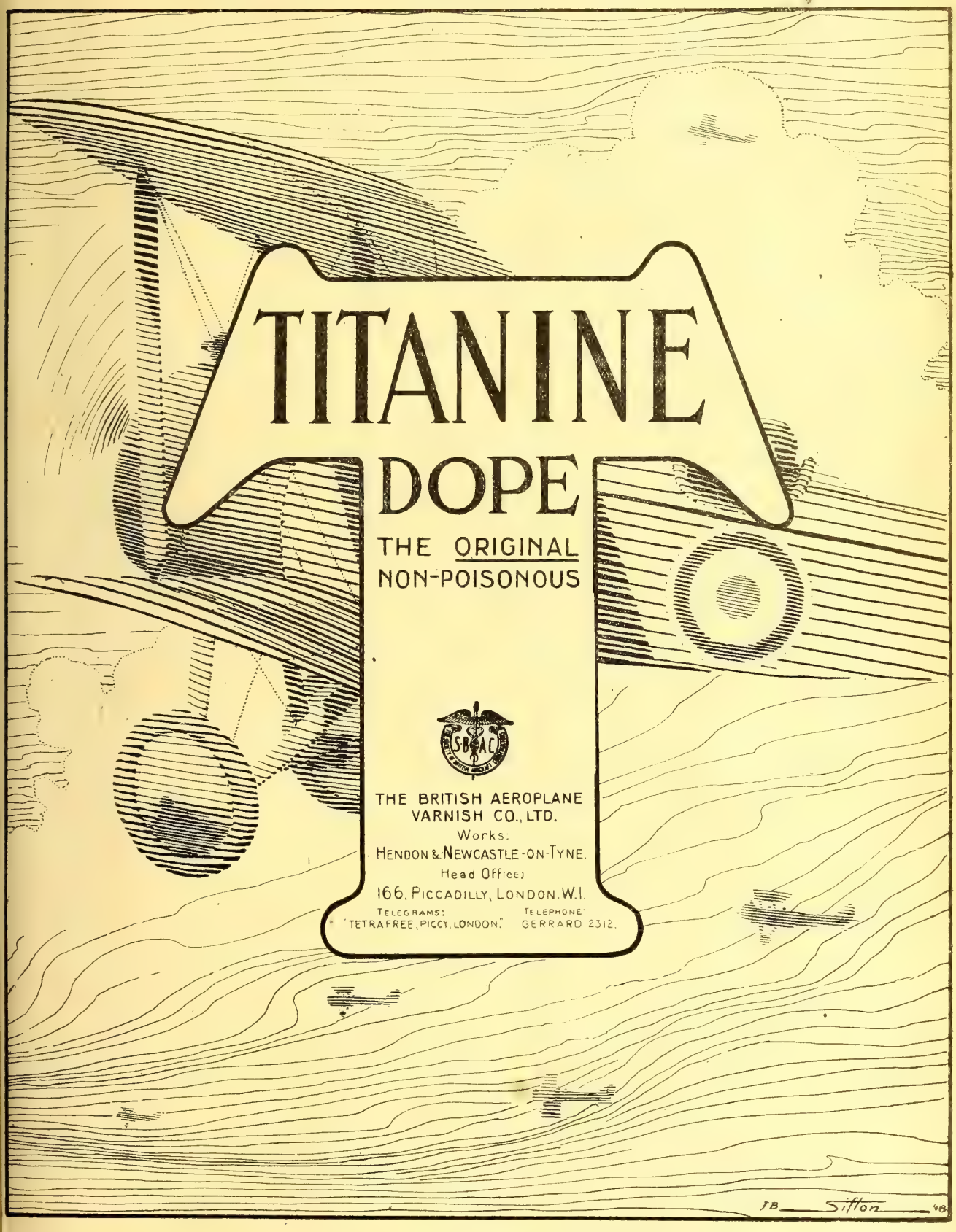


the central part or boss D, this boss being of a length equal to the widest part of the blade B C on a line parallel with axis of rotation and of the small diameter required for aerial driving. The blades are joined to the boss along the full range of their greatest width, and may be shaped so that the revolution space figure is bevelled on one or both sides, and may be dished to give a trailing or facing element as desired. Specification 9045/15 is referred to.

113,467. Framework for Aeroplanes, etc. Bolotoff, S. V. de, Kippington Court, Sevenoaks, Kent.



A device for receiving the ends of struts employed in aeroplanes and other structures comprises two angle-plates B, C arranged at diagonally opposite edges of a frame member A, and connected together by pairs of bolts E fitted with distance tubes D^1, struts A^1, A^2 being received between each pair of bolts. The tubes D^1 may be formed with wiring-lugs D, and a diagonal bolt G may be provided, and may carry a wiring-lug G^1. The device may be modified for struts that are not at right angles, and also for struts with tapered ends.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
Works:
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON. W.1.
TELEGRAMS:
"TETRAFREE, PICCY, LONDON."
TELEPHONE:
GERRARD 2312.
JB Sifton '18

The Curtiss Flying Boat Patents—the Patentee's Claims.

Concerning the Patent Specifications covering certain types of flying-boats owned by Mr. Glenn H. Curtiss, which were reproduced in The Aeroplane last week, he has lodged the following claim regarding the instances where the patents are applicable :—

1. An aeroplane body comprising a main flotation body, the bottom of which is shaped to form hydroplane surfaces, and forwardly located marginal excrescent structures on the sides of said main flotation body, the bottoms of which are co-extensive with and in continuation of the hydroplaning surfaces of said bottom.

2. A hydroplane boat comprising a main flotation body, the bottom of which is shaped to form hydroplaning surfaces, and marginal excrescent structures on the sides of said flotation body, extending longitudinally substantially the full length of said hydroplaning surfaces and having their bottoms in continuation of said hydroplane surfaces.

3. A hydroplane boat for hydro-aeroplanes comprising a main flotation body, the bottom of which is shaped to form hydroplaning surfaces, and forwardly located excrescent flotation structures of triangular cross section on the sides of said main flotation body opposite the resultant centre of aeroplane lift, one side of said section being in continuation of the transverse section of the bottom of the boat, another side parallel to the side of the main body, and the third side extending laterally and downwardly from a point on the side of the boat intermediate the chime and the gunwale.

4. A hydroplane boat body having an interior water-tight space for occupancy by the flying crew or other useful load together with water-tight fin excrescences arranged to flank said space in the vicinity of the bottom of the boat, the excrescences conjointly functioning as planing surfaces and as lateral water-tight compartments protecting said space.

5. A hydroplane boat body having an interior water-tight space for occupancy by the flying crew or other useful load together with water-tight compartments respectively ahead of, aft of, and at each side of said space, the side compartments being in the form of fin excrescences arranged to extend out laterally from the boat-body proper to augment the hydroplaning area thereof.

6. A flying boat adapted to travel upon the surface of the water, rise therefrom and travel through the air, comprising a hydroplaning bottom surface laterally extended beyond the plane of the gunwales of the boat body proper by fin excrescences arranged at opposite sides of said body principally ahead of the centre of gravity of the craft, the corresponding surfaces of said excrescences making a dihedral angle with the vertex thereof in the vertical plane of the keel line of said boat.

7. In a hull for flying-boats, a V-shaped hydroplaning bottom and acutely V-shaped planing fins, each fin having one side formed in the plane of one of the V-sides of the bottom.

8. In a hull for flying-boats, a V-shaped hydroplaning bottom, integral continuations of said bottom forming surfaces projecting beyond the hull and second surfaces projecting from the sides of the hull for intersection with the first said surfaces.

9. A flying-boat including a main flotation body having a hydroplaning bottom, and fine excrescences arranged to augment said bottom laterally in the vicinity of the resultant centre of hydroplane lift as determined through hydroplaning action on the surface of the water and preparatory to flight.

10. In a hull for flying-boats, a V-shaped hydroplaning bottom and auxiliary planing fins formed as lateral extensions of said bottom, said fins being enlarged rearwardly from the bow of the hull in directions providing longitudinal and transverse streamlines.

11. In a flying-boat, a hull rounding off rearwardly from its bow to provide a hydroplaning bottom and rounding off oppositely to provide a cabin situated over said bottom, and a fore deck for the hull intersecting the generating hull lines for the cabin.

12. A hull for flying-boats enlarging rearwardly along rounded, upper and lower longitudinal hull lines, a hydroplaning bottom for the hull merging into the lower hull lines, and a deck intersecting the upper hull lines for provision of a cabin over said bottom.

13. In a flying-boat, a hull, a cabin having streamlines merging integrally into the hull in one direction and a conning-top rounding off the streamlines of the cabin in the other direction.

14. A hull for flying-boats having its elevational aspect determined by lines rounding off rearwardly both upwardly and downwardly from the nose of the hull, and a deck intersecting the said upper boat line and cutting down the hull to provide a cabin.

15. In a hydroplane hull, an overhanging bow having an elevational aspect determined by lines rounding off rearwardly and downwardly, a bottom V-shaped in cross section, the angled portions of the bottom having their inception at the bow and considerably above the water-line, each portion being decreasingly concaved from the nose rearwardly and the angle between the portions rearwardly, approaching a maximum obtuseness, and a step terminating said bottom.

16. In a hydroplane hull, a fore-body, a tail, a planing step dividing the bottom of the fore-body from the tail bottom, an upper surface for the tail enlarging forwardly in a reverse curve over said step and a cabin roof provided over the fore-body in advance of said step and merging into said enlarging tail surface.

17. In a hydroplane hull, a fore-body, a tail, a planing step dividing the bottom of the fore-body from the tail bottom, an upper surface for the tail enlarging forwardly in a reverse curve over said step to form a cabin roof for the fore-body and a deck intersecting said fore-body at a distance below said roof and destroying a normal merging of the roof line into the nose of the hull.

18. In a hydroplane hull, a fore-body, a tail, a cabin provided for said fore-body and having a roof merging rearwardly into said tail and forwardly into the nose of the hull, a deck intersecting the cabin and a cockpit provided at the intersection of said cabin and deck.

19. A flying-boat including a flotation body having an underneath hydroplaning surface of a size in cross section designed to extend out on either side beyond the boat-body proper approximately opposite the centre of hydroplane lift, the bottom surfaces of the laterally extended portions making a dihedral angle with the vertex of the angle in the vertical plane of the keel line of the boat.

20. A flying-boat including a main flotation body having an underneath hydroplaning surface of substantially V-form in transverse section, fin excrescences arranged to augment the hydroplaning surface laterally in the vicinity of the resultant centre of hydroplane lift, the bottom surfaces of the fins continuing uninterruptedly the hydroplaning bottom of the boat-body proper.

21. A flying-boat including a main flotation body, a hydroplaning under surface, and lateral extensions of a construction designed to conform longitudinally to said hydroplaning under surface and to extend substantially the full length thereof.

22. In a hydro-aeroplane boat-body, a bottom, longitudinally convexed, and auxiliary planing surfaces formed as lateral extensions of said bottom in the vicinity of the resultant centre of hydroplane lift, said centre lying considerably in advance of the point of maximum convexity, and sufficiently distant therefrom to provide for its movement rearwardly to a point in the vicinity of said point of maximum convexity upon fore and aft oscillation of the boat.

23. In a hydro-aeroplane boat-body, a bottom longitudinally convexed, aeroplane wings extending intermediately across said body, the point of maximum convexity underlying said wings, auxiliary planing surfaces formed as lateral extensions of said bottom, said surfaces commencing in advance of the resultant centre of hydroplane lift and terminating rearwardly in the vicinity of said point of maximum convexity.

24. In a flying-boat, a main flotation body, a hydroplaning under surface, fin excrescences co-extensive with the hydroplaning surface, each fin extending forwardly beyond a line in the vertical plane of the resultant centre of hydroplane lift a greater distance than to the rear thereof.

25. A flying-boat including a forward hydroplaning bottom designed to extend from end to end uninterruptedly and at an angle laterally beyond the sides of the boat-body proper to materially increase the hydroplaning surface and enable the boat to come rapidly to its hydroplaning position upon the surface of the water and to rise from that position into the air.

26. In a hydroplane boat, a bottom longitudinally convexed, and auxiliary planing surfaces formed as lateral extensions of said bottom to extend substantially to the full length of that portion of said bottom ahead of a point determining the maximum convexity thereof.

27. In hydro-aeroplane flotation body, a longitudinally convexed bottom in which that portion of said bottom in advance of the point of maximum convexity is of hydroplaning form, fin excrescences arranged to augment said bottom laterally in the vicinity of the resultant centre of hydroplane lift, aeroplane wings, the centre of pressure on said wings being disposed in the approximate transverse vertical plane of said point of maximum convexity, and said point determining the rearward terminus of said fins and the rearmost point to which the centre of hydroplane lift may be shifted as the body in its entirety is oscillated fore and aft.

THE FLAX MARKET.

Details of flax supplies given by Mr. Kellaway in a written reply to Mr. Kelly show that all the markets last year were in Ireland. Flax markets were held in 25 towns up to March 31st, 1918, for the 1917 crop. The total flax bought in all markets was 11,934 tons, at a total cost of £2,717,981. The average price per stone was 28s. 6d.

Firth's Aircraft Steels.

Mark "A" Non-Magnetic
Bullet-proof Plates
For Armouring Aircraft.

Thos. Firth & Sons Ld.,
Sheffield.

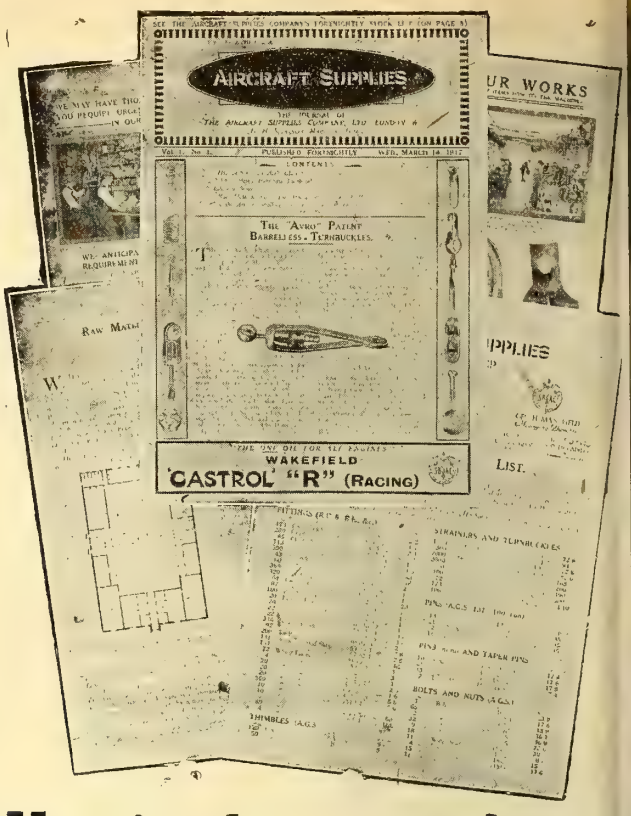
VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.



"Here's the very thing

It often happens daily. There's a need for certain aircraft part—quick provision is vit There are urgent enquiries—and then—som body thinks of "Aircraft Supplies." A co of this fortnightly aircraft journal yields invaluable information, and nine times o of ten the lacking part is found on enqui to be ready in stock at Ascol House f immediate delivery. That's a phase "Ascol" Service—everything from a split p to a complete unit can be seen at Asc House—everything guaranteed to pass A.I.

WHAT ARE YOU NEEDING

THE AIRCRAFT SUPPLIE COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

Head Offices, Showrooms, and Stores:

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.

Representatives in Birmingham, Manchester, Leeds, Belfast, Northe Counties and Scotland, South Coast and the London District.

Works:	*Telephone:*	*Telegrams*
Little James St.,	Gerrard ... ... 276.	"Upcast, Ra
London :: W.C.1.	Private Branch Exchange.	London.

G. H. MANSFIELD, *Managing Director.*

ASCOL

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

April 25th, 1918.

)PPER.—Although the output is reaching a colossal figure, is very little metal available for ordinary commercial purs; the U.S. Government and the other Allied Governments ıg practically all that is produced.

ıe agitation amongst certain producers for an advance in official price seems to have come to an abrupt end, and it s as though some ulterior motive was behind the complaints h were made.

Standard Cash	£110 per ton.
Electrolytic	£125 to £121
B.S.	£123 to £119

N.—The two main factors which continue to keep this :et in an unsettled condition are: The Shipping position and ıigh level of prices in the East. In consequence of the high s which are being paid in the East, the prices here have ne very much inflated, the price of Standard Tin having ad- d £11 per ton in a week. Sellers are, of course, very e, and it is impossible to buy forward Tin.

e whole situation is very complex, and unless some drastic n is taken, there does not appear to be much hope of im- ement. The demand in U.S.A. is very large indeed; but, tunately, adequate supplies are not being received, and the tion there is causing much anxiety.

ere is, apparently, plenty of Tin here, but, owing to the ulty of replacing stocks, except at the inflated prices ruling e East, sellers are reluctant to offer.

Prices.

Standard Cash	£333 0 0 per ton.
Straits	£333 10 0 per ton.
English	£341 0 0 per ton.
Eastern	£343 0 0 per ton.

AD.—Supplies of Lead for work of national importance are ery difficult to obtain, and prices remain unchanged.

EEL.—Supplies of Steel are not very difficult to procure, he output is most favourable. The demands for ships, tanks, ıeroplanes are, of course, increasing. There does not, how- appear to be any fear of a shortage of Steel.

ces remain unchanged.

MBER.—The position is still most serious, and the situation ing keenly, but anxiously, watched. It is rumoured that ructors have been notified that the use of ———, which is nly Silver Spruce substitute available, has been forbidden for where stress is required. In other words, the quantity ı may be used is infinitesimal; it is also rumoured that er unsatisfactory timber may be supplied for aeroplane . It is to be hoped that this rumour is without foundation.

velopments are eagerly awaited.

pplies of Mahogany and Walnut are fairly well maintained, prices are very firm.

BRIC.—It is stated that the Air Ministry has the Fabric ion well in hand, and there is no fear of a shortage of ies. The present state of affairs in Ireland cannot, however, nored, and steps should be taken to provide against unfore- contingencies.

MACHINE TOOLS.

pursuance of the instructions of the Controller of Machine , dated February 19th, 1918, Reference H.H.B./G.S., the taking to be signed by, or on behalf of, dealers in eers' and machinists' imported small tools is now cancelled. Ministry of Munitions has, however, imposed the following ations with regard to priority classification in respect of all tools, whether imported or of British manufacture:—

firm or person is permitted to issue a class "A" cate with an order for small tools unless—

a) Such small tools form a component part of a direct ernment contract, or

b) Specially authorised in writing to do so by the Priority partment of the Ministry of Munitions. Any applications such higher priority must be made through the Director Small Tools, Charing Cross Buildings, Embankment, W.C.2.

class "A" certificate issued must bear the contract er in the case of (a) and the priority permit number and fication in the case of (b). Firms holding a P.5. maintenance permit are authorised to quote their maintenance permit number and priority classification on orders for small tools up to the value allowed under the terms of their maintenance permit. All other firms and persons placing orders for small tools required for the upkeep of existing industrial plant should issue a class "B" certificate with their order. Orders for small tools without certificates may only be accepted when such orders can be executed from stock and without prejudice to orders received with classification certificates as above.

The above regulations do not permit the issue of a class "A" certificate for small tools, which are required for the manufacture of goods ordered on a direct Government contract, e.g., a firm having a direct contract from the Ministry of Munitions for the manufacture of guns may issue a class "A" certificate bearing the appropriate priority classification attached to the contract for any of the material used in the manufacture of guns, but such a firm can only issue a class "B" certificate for the small tools to be used in the manufacture of guns.

TO ECONOMISE DRILLS.

The loss of time and money involved in all engineering by the breakage of drills occasioned by a long length of drill projecting from the chuck is well known to those concerned with aircraft production. An ingenious device has been produced under patent by the Central Drill Protector Company, which overcomes this difficulty in a very practical fashion.

It can be supplied for drills ranging in size from 1-10th by 64ths up to ¼-inch, and also in millimetres. Inquiries should be addressed to the Central Drill Protector Company, Halton House, 21-23, Holborn, E.C.1.

A CHANGE OF ADDRESS.

It should be noted that the offices of the British Petroleum Co., Ltd., at 117-123, Great Portland Street, London, W.1, have been commandeered by the Government, and the London Branch (Town, Northern and Southern Divisions) has at very short notice been removed to—4, 5, 6 and 7, Chiswell Street, Finsbury, London, E.C.1.

A TABLE OF TURNBUCKLES.

Mann, Egerton and Co., Ltd., of 177, Cleveland Street, London, W.1, who have for a considerable time taken an active interest in aircraft production, have issued an interesting table setting forth the specification of various types of A.G.S. turnbuckles and sizes of other types.

A copy of this table has been forwarded to many aircraft constructors in the country, but any firm which has not received a copy is requested to apply for one at the above address. The table is useful as it shows clearly substitute turnbuckles which can be used alternatively.

AMERICAN TIMBER CONTROL.

Competition between large concerns seeking to supply the U.S. Government with aircraft spruce has been eliminated by an agreement reached by representatives of the companies and the Spruce Production division of the Signal Corps.

The Aeroplane Spruce & Lumber Co., of Hoquiam, has been assigned to Grays Harbour Country.

The Warren Spruce Co., of Portland, has been assigned to the Siletz basin and the Alsea bay district and a portion of Grays Harbour Country.

The Grant-Smith-Porter Brothers Co., of Portland, has been assigned the Southern portion of Pacific Country and unassigned portions of Oregon.

A HANDLEY PAGE FUNCTION.

A highly successful evening was held on Saturday, April 20th, at St. Peter's Hall, Cricklewood Lane, by the "Handley Page" Branch of the National Federation of Discharged and Demobilised Sailors and Soldiers which held a concert and dance.

The hall was tastefully decorated and great appreciation was shown in the way the programme was arranged by Mr. F. Lee, a discharged soldier himself.

It would be very hard to say which artiste excelled, and had it not been for the lighting regulations it would have been midnight before the entertainment finished.

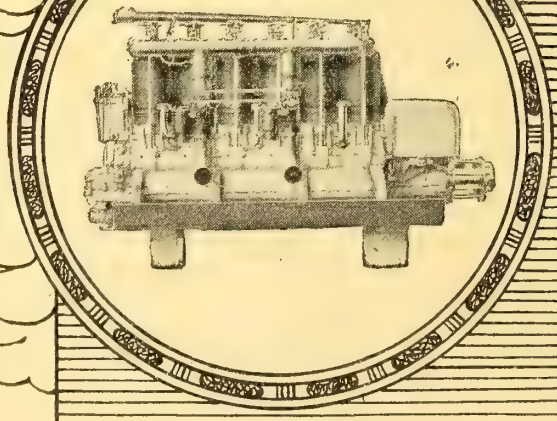
During the interval the Secretary (Mr. H. Brain) thanked everybody who helped on behalf of the branch, and also gave a few words of advice on the position of soldiers' dependants in regards to pensions, etc.



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

BEARDMORE AERO ENGINE



The Name which guarantees EFFICIENCY and advanced design.

The BEARDMORE AERO ENGINE Ltd.
London Showrooms and Depots:
112, Gt. Portland Street, London, W.1.
Telephone: Gerrard 238.

C.D.C.

(*Continued from page 1599A*).

Temp. Sec. Lt. C. F. Nathan, Gen. List and R.F.C.

As observer, when information was urgently required during an attack, and several attempts to obtain it had been unsuccessful owing to exceptionally bad weather conditions, he went out with his pilot and succeeded in gaining the necessary information, flying at a height of about 50 ft. under heavy rifle and machine-gun fire. He had already made a flight under similar conditions on the same day. He showed great courage and determination.

Lt. E. T. Owles, R. Ir. Fus., Spec. Res. and R.F.C.

He made a successful wire reconnaissance along a corps front at a height of 300 ft. to 800 ft. under heavy machine-gun and rifle fire. On another occasion while on a reconnoitring patrol he had four encounters with enemy aeroplanes, in one of which he was attacked at 800 ft. by five enemy scouts. By his clever manœuvring the enemy machines were driven off, and he completed a valuable reconnaissance. He showed the greatest keenness and determination at his work.

Temp. Lt. (temp. Capt.) A. H. Peck, Gen. List and R.F.C.

He engaged single-handed three enemy aeroplanes, though they had superior height. He drove them back over their lines, and prevented them from carrying out their reconnaissance.

Lt. S. L. Quine, Ches. R., Spec. Res. and R.F.C.

He went out in exceptionally rough and stormy weather during an attack, and, flying very low over the enemy's batteries, reported and located those which were in action. By his courageous and determined efforts he assisted materially in clearing up the situation, and enabled effective fire to be brought to bear on the enemy's batteries.

Temp. Sec. Lt. K. G. Sclanders, Gen. List and R.F.C.

He carried out two most important photographic reconnaissances of the enemy's position under intense anti-aircraft fire.

Temp. Sec. Lt. D. H. Sessions, Gen. List and R.F.C.

During two months he did 111 hours' flying on artillery work, often under heavy anti-aircraft fire. He constantly observed most successfully for the artillery, causing direct hits on gun pits, fires, and explosions.

* Capt. W. Smith, Lond. R. and R.F.C.

For conspicuous gallantry and devotion to duty in 32 long-distance bomb raids, many of which were carried out under very unfavourable weather and conditions.

* The name marked thus appeared in the "Gazette" dated Oct. 27th, 1917.

Temp. Lt. (temp. Capt.) J. B. Solomon, Ox. and Bucks L.I. and R.F.C.

He carried out a patrol lasting nearly three hours in a very high wind and low clouds, flying at an average height of 500ft. and brought back a valuable report. During this flight he attacked and drove down an enemy two-seater machine under heavy rifle and machine-gun fire from the ground. He also made a valuable reconnaissance in very bad weather, flying at an average height of 100 ft. under heavy rifle and machine-gun fire, in the course of which he engaged a hostile battery with his machine-gun. He set a splendid example of courage and determination.

Temp. Lt. A. J. Tyler, Gen. List and R.F.C.

He took an active part in several engagements. He went up in all weathers and located many enemy batteries. He showed splendid determination and resource when under heavy fire.

Sec. Lt. (temp. Lt.) L. B. Williams, Gen. List and R.F.C.

During an attack with machine-guns and bombs on enemy infantry he displayed great courage and endurance in spite of very adverse weather conditions, which caused the machines to become separated in the fog. Observing a hostile battery in action he released bombs on it, one of which was observed to be a direct hit. Afterwards, whilst continuing his attacks on the enemy front trenches, his main plane was blown away, and his machine crashed to earth in the open. Being wounded, he lay there unable to move, but was eventually rescued. This officer has always shown himself full of zeal, determination, and courage.

Lt. J. H. G. Womersley, R.G.A. and R.F.C.

In aerial fighting he brought down four enemy machines and forced others to land. He also carried out reconnaissances at a low altitude.

Australian Imperial Force.

Capt. and Flt. Comdr. S. I. Winter-Irving, F.C.

When acting as escort during a reconnaissance he repeatedly attacked and drove off single-handed a formation of three enemy aeroplanes, thereby enabling a most valuable reconnaissance to be made.

* * *

The King has been pleased to approve of the award of the Military Medal for bravery in the Field to the following Non-commissioned Officers and Man :—

1429 Serjt. E. J. Elton, R.F.C (Wimborne).

4909 1st Cl. Air Mech. S. L. Bennington, R.F.C. (Tottenham, Midd'x.)

14374 Serjt. H. W. Scarnell, R.F.C. (Hertford).

Admiralty, April 26th.

The following officer and man have been mentioned in dispatches for services in action with enemy submarines :—

Flt. Lt. C. S. Hay, R.N.A.S.

Actg. Air Mech., 1st Cl., G. W. Ewbank, O.N. F16420.

* * *

The King has been pleased to approve of the award of the following honours and medals to the following officers and men :—

Evacuation of Thermi Aerodrome.

The Distinguished Service Order.

Comdr. G. C. Chichester, R.N.—In recognition of the energy, good judgment, and coolness under fire with which he organised and executed the evacuation of the Aerodrome at Thermi Mityleni, on October 9th to 15th, 1917. The evacuation of the aerodrome was carried out under continuous bombardment by the enemy, and was effected entirely without casualties and without loss of stores.

The Distinguished Service Medal.

A.B. G. A. Chapman, O.N. 218967 (Ch.); Ldg. Sto. E. Chivers, O.N. K 5051 (Ch.); P.O. D. Keen, O.N. 190743 (Ch.); A.B. J. T. Timlin, O.N. 238582 (Dev.)

Mentions in Dispatches.

The following officer and men have been mentioned in dispatches :—

Actg. Gnr. (T.) (now Actg. Mate) H. Pursey, R.N.; Pte. J. M. Ryan, R.M.L.I., No. Po./19256; C.P.O. J. K. W. Tadd, O.N. 138185 (R.F.R., Dev./A3129).

* * *

The King has been pleased to approve of the award of the following honours, decorations, and medals to officers and men of the Royal Naval Air Service in recognition of their services at Dunkirk :—

The Distinguished Service Order.

Wing Capt. R. H. Clark-Hall, R.N.; Wing Comdr. H. M. Cave-Brown-Cave, R.N.; Sqdn. Comdr. R. S. Dallas, D.S.C., R.N.A.S.

A Bar to the Distinguished Service Order.

Wing Comdr. R. H. Mulock, D.S.O., R.N.A.S.

The Distinguished Service Cross.

Sqdn. Comdr. C. Draper, R.N.A.S.; Sqdn. Comdr. A. R. Arnold, R.N.A.S.; Sqdn. Comdr. W. L. Welsh, R.N.A.S.; Flt. Lt. (Actg. Flt. Comdr.) F. E. Banbury, R.N.A.S.

The Distinguished Service Medal.

C.P.O. G. E. Barrett, O.N. F 656; Ldg. Mech. (E.) E. H. Beesley, O.N. F 10447; C.P.O., 3rd Gr., F. A. Benfield, O.N. M 1722 (Po.); P.O. (E.) R. A. Clarke, O.N. F 3896; C.P.O. (E.) E. Dessaussois, O.N. F 1663; C.P.O. (E.) H. Gott, O.N. 271902 (Ch.); C.P.O. (E.) J. V. Grieve, O.N. F 263; C.P.O. (E.) W. A. Hill, O.N. F 4596; Air Mech., 2nd Gr. (G.) J. D. R. Innes, O.N. F 8687; C.P.O., 3rd Gr. (R./H.) T. S. Jobling, O.N. F 249; C.P.O. (E.) W. L. Johnson, O.N. F 4529; C.P.O., 3rd Gr. (W.), A. E. Le Sueur, O.N. F 3413; C.P.O. (E), H. Mann, O.N. F 485; P.O. (R./H.), E. W. Mayes, O.N. F 3507; C.P.O., 3rd Gr. (E.), F. Moore, O.N. F 1637; 3rd Writer R. A. Pennington, O.N. M 16116 (Po.); 3rd Writer W. Quaye, O.N. M 20159 (Ch.); P.O. (R.H.) C. E. Roust, O.N. F 3903; P.O. (R./H.) C. O. Towler, O.N. 237507 (Po.).

Mentions in Dispatches.

The following officers and men have been mentioned in dispatches :—

Flt. Payr. F. R. Waymouth, R.N.; Lt.-Comdr. R. Bull, R.N.V.R.; Sqdn.-Comdr. W. Wright, R.N.A.S.; Lt. A. S. Cheshire, R.N.V.R.; Lt. W. D. Wain, R.N.V.R.; Hon. Dental Surg. H. J. Corin, R.N.V.R.; P.O. (W./T.) H. Aves, O.N. F 422; C.P.O. (R./H.) P. Coyle, O.N. 218288 (Ch.); P.O. (E.) H. Dawson, O.N. F 4755; C.P.O. (E.) W. Griffiths, O.N. F 8339; P.O. (W.) E. C. Hooper, O.N. F 5113; P.O. Mech. A. E. Humphrey, O.N. F 2348; Ldg. Mech. (C.) R. F. Manders, O.N. F 11078; Ldg. Mech. (E.) F. R. Maskell, O.N. F 8; C.P.O., 3rd Gr. (E.) L. G. Miles, O.N. F 1149; P.O. (C.) J. M. Mitchell, O.N. F 3689; P.O. (E.) H. W. Newill, O.N. F 2272; P.O. (E.) V. S. Parker, O.N. F 2220; P.O. (C.) R. W. Petch, O.N. F 9289; C.P.O., 3rd Gr. (E.), W. C. Reeves, O.N. F 3123; C.P.O., 3rd Gr. (E.) A. Smith, O.N. F 1594; C.P.O., 3rd Gr. (E.), J. R. Strathan, O.N. F 2461; P.O. (C.) E. Strain, O.N. F 2101; C.P.O., 1st Gr. (E.), R. Tuck, O.N. 271357 (Po.).

Miscellaneous.

The Distinguished Service Order.

Flt. Comdr. F. T. Digby, D.S.C., R.N.A.S.

For the consistent determination, gallantry, and skill displayed by him in long-distance bombing raids, particularly on the night of March 24th-25th 1918. On that date, in spite

of mist, which made the journey most difficult, he eventually reached his objective, which he bombed with good results.

THE DISTINGUISHED SERVICE CROSS.

Sqdn. Comdr. A. B. GASKELL, R.N.A.S.

In recognition of his services on the occasion of the evacuation of the Thermi aerodrome on October 9th to 15th, 1917, under continuous bombardment by the enemy.

Flt. Lt. (Actg. Flt. Comdr.) L. H. ROCHFORD, R.N.A.S.

For the consistent determination, bravery, and skill as a fighting pilot and flight commander. He has destroyed and driven out of control many enemy machines.

Flt. Lt. J. A. GLEN, R.N.A.S.

For exceptional gallantry and skill as a fighting pilot and flight leader. On July 7th, 1917, he attacked two seaplanes off Ostend. In conjunction with other pilots he shot down one which crashed into the sea. The second he attacked himself, and after a short combat it also crashed into the sea, sinking immediately. He has destroyed and driven down out of control many enemy machines.

Flt. Lt. A. T. WHEALY, R.N.A.S.

For the most consistent determination, bravery and skill with which he has carried out numerous low-flying harassing attacks on the enemy's troops, transports, etc., inflicting heavy casualties and damage. By his splendid example and gallantry a great many hostile operations were hampered and frustrated. He has further brought down many enemy machines.

Flt. Lt. A. B. ELLWOOD, R.N.A.S.

For the determination and skill displayed by him as a pilot. On March 10th, 1918, he attacked three Albatros scouts. He drove two of the enemy aircraft down, and then dived on the third and fired a long burst. The enemy machine pulled up, fell over on its side, and fell straight down out of control until lost to sight. He has also destroyed or brought down out of control many other enemy machines.

A BAR TO THE DISTINGUISHED SERVICE CROSS.

Flt. Lt. S. M. KINKEAD, D.S.C., R.N.A.S.

For the skill and courage displayed by him as a pilot. On March 22nd, 1918, he attacked and drove down out of control an Albatros scout which was attacking a French machine. He has brought down many other enemy machines. He is an exceptionally good pilot, and a clever and plucky fighter, and has performed very fine work, both on offensive patrols and on low-flying missions.

Flt. Lt. E. DICKSON, D.S.C., R.N.A.S.

For conspicuous gallantry in attacking enemy aircraft, and in carrying out bombing raids. On March 16th, 1918, he went to the assistance of a machine of his formation which was being attacked at close quarters by 12 enemy scouts. Despite the fact that all the guns on his machine were useless, owing to lack of ammunition, he turned and charged the hostile formation, splitting it up and diverting their attention from the other machine, thus undoubtedly saving it. On other occasions he has brought down enemy machines and taken part in many daylight bombing raids, at all times showing utter fearlessness and great determination.

Obsr. Lt. C. CHAPMAN, D.S.C., R.N.A.S.

In recognition of his services on March 21st, 1918, when he carried out successful spotting for the bombardment of Ostend. On other occasions he has carried out valuable reconnaissances for the Fleet.

THE CONSPICUOUS GALLANTRY MEDAL.

Ldg. Mech. (E.) S. F. ANDERSON, D.S.M., O.N., F.12676.

For conspicuous gallantry, initiative, and courage displayed by him on March 19th, 1918, when the petrol system of his machine sustained extensive damage in action with enemy aircraft. After repairing the damage to the petrol system he noticed that the starboard engine was boiling violently. After reporting to the officer in charge and requesting that the engine should be throttled down as far as possible, he climbed out on the lower plane, and effected extensive repairs to the water circulation system, and thus enabled the engine to be opened out to the desired number of revolutions. Ldg. Mech. Anderson's work, which was carried out entirely in the open in a wind force of 90 miles per hour, and occupied 1¾ hour, undoubtedly saved the machine.

A BAR TO THE DISTINGUISHED SERVICE MEDAL.

Air Mech., 1st Gr., P. J. ADKINS, O.N. F.2763.

MENTIONS IN DISPATCHES.

The following Officer and Men have been mentioned in dispatches :—

Warrt. Officer, 2nd Gr., A. H. Mitchell, R.N.A.S.; Ldg. Mech. A. Copp, O.N. F.560; P.O. (R./H.) A. Parish, O.N. F.9288.

* * *

The following Decorations have been conferred by the Allied Powers on Officers and Men of the British Naval Forces for distinguished services rendered during the war. The King has given unrestricted permission to the Officers and Men concerned to wear the Decorations in question :—

CONFERRED BY THE KING OF THE HELLENES.

ORDER OF THE REDEEMER.

OFFICER.

Maj. (temp. Lt.-Col.) A. C. BARNBY, R.M.L.I., Sqdn. Comdr., R.N.A.S.

CHEVALIER.

Flt. Lt. S. H. GASKELL, R.N.A.S.

Actg. Flt. Comdr. C. GILMOUR, R.N.A.S.

MEDAL FOR MILITARY MERIT.

Warrt. Officer, 2nd Gr., A. H. MITCHELL, R.N.A.S.

Air Mech., 1st Gr., W. S. STEVENS, O.N. F.8986.

WAR OFFICE, April 26th.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING.—Equipt. Officer, 1st Cl.—Temp. Lt. C. M. Dyer, Gen. List, and to be temp. Capt. while so empld., Feb. 10th.

INFANTRY.—E. Surr. R.—Temp. Capt. R. J. Sanceau, from R.F.C., July 5th, 1915. S. Staff. R.—Temp. Capt. H. T. Hanmer, from R.F.C., Jan. 19th, 1916.

* * *

The King has been pleased to award the Albert Medal in recognition of gallantry displayed in endeavouring to save life :—

Flt. Serjt. ALBERT E. WARNE, 24th Wing Aeroplane Repair Section and Flt. Serjt. HORACE CANNON, No. 50 Training Squadron.

On January 26th last, while flying in England, a pilot, when attempting to land, lost control of his machine, which crashed to the ground from a height of about 150 feet and burst into flames. Flt. Serjts. Warne and Cannon went to the rescue of the pilot at great personal risk, as one tank of petrol blew up and another was on fire; moreover, the machine was equipped with a belt of live cartridges which they dragged out of the flames. They managed to extricate the pilot, who was strapped to the burning plane, but he died shortly afterwards from his injuries and burns.

AIR MINISTRY, April 26th.

R.A.F.—The following temporary appointments are made at the Air Ministry :—

STAFF OFFICER, 2ND CLASS.

Capt. Hon. O. M. Guest, and to be temp. Maj. while so empld., April 18th.

Capt. H. French, and to be temp. Maj. while so empld., April 23rd.

Col. J. D. Edwards, C.B., to be temp. Brig. Gen. while empld. at the Air Ministry, April 1st.

FLYING BRANCH.

To be temp. Lt.-Cols. while empld. as Lt.-Cols. (Flying) :—Maj. S. Smith, D.S.O., Capt. (temp. Maj.) K. R. van Der Spuy, M.C., April 17th; Maj. E. M. Murray, M.C. (seny. April 17th). Maj. E. H. M. O'Farrell (seny. April 17th), April 19th.

Capt. (temp. Maj.) E. L. Millar to retain his rank while empld. as Maj. (Flying), April 6th.

Lt. (temp. Capt.) S. G. Kingsley, M.C., to be temp. Maj. while empld. as Maj. (Flying), April 20th.

Lt. G. G. Crutchley to be temp. Capt. while specially empld., April 27th.

To be Obsr. Officers :—Temp. Sec. Lt. D. L. Brocklesby, April 2nd; Temp. Sec. Lt. J. M. Dunn, Temp. Sec. Lt. J. A. Ellis, Temp. Sec. Lt. A. K. Mackereth, April 4th.

Lt. R. V. Waters relinquishes his commn. on account of ill-health contracted on active service, April 27th.

ADMINISTRATIVE BRANCH.

Capt. G. Stevens to be temp. Maj. while empld. as Admin. Maj., April 18th.

Sec. Lt. and Hon. Capt. C. S. Burdon to be temp. Capt. while empld. as Admin. Capt., April 1st.

H. G. Stuart, M.C. (Sec. Lt. in Army), is granted a temp. commn. as Lt., April 27th.

The following are granted temp. commns. as Lts. :—G. F. Ansell, W. H. Lyall, April 1st.

The following are granted temp. commns. as Sec. Lts. :—F. T. L. Avis, S. E. Baile, F. C. Bird, E. G. Boone, W. G. Chate, R. St. G. Chester-Master, J. P. A. Donaghy, A. Edwards, H. C. F. Ellis, C. Freeman, P. W. Gibbs, F. W. Healey, L. J. Marden, E. G. Masson, B. A. Matthews, C. C. Moldram, N. O'Reilly, W. B. T. O'Sullivan, W. E. Randall, J. L. Saxton, J. R. Senior, W. F. Swan, J. B. West, M. J. Wolseley, Cpl. C. W. Braddy (from R.A.F.), Flt. Serjt. J. Freeman-Fowler (from R.A.F.), H. D. Fletcher, Serjt. G. J. Mackie (from R.A.F.), April 1st; W. S. Sholl, 1st Writer R. S. Davidson (from R.N.D.), April 3rd; 2nd Cl. Air Mech. A. J. Williamson (from R.A.F.), April 4th; J. Bremner, H. G. Brodie, L. N. Bubier, H. Byatt, F. G. Cartman, C. W. Curtis, C. L. Hales, F. C. Hook, W. H. Jones, G. Mitchell, R. Myer, E. C. St. A. Newby, H. Nixon, E. U. Poyser, W. Roxburgh, H. N. Sauer, W. H. E. Thomas, R. N. Walter, H. A. Young, April 5th; Cdt. (Pte.) S. W. Turner (from Dorset R.), Cdt. G. Hill (from Can. Rly. Troops), T. Hodgson, April 6th.

Capt. (temp. Lt.-Col.) G. W. Williamson, M.C., relinquishes the temp. rank of Lt.-Col. on ceasing to be empld. with the Ministry of Munitions, April 5th.

Sec. Lt. H. T. Kingsley to relinquish his commn. on account of ill-health contracted on active service, April 27th.

TECHNICAL BRANCH.

Capt. A. Graves to be temp. Maj. while empld. as Maj. (Tech.), April 6th.

Temp. Sec. Lt. H. C. Atkin to be temp. Sec. Lt. (Tech.), April 1st.

WAR OFFICE, April 27th.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING.—Flt. Comdr.—Capt. W. A. Hannay, L'pool R., from a Flying Officer, March 1st.

Equipt. Officers, 1st Cl.—And to be temp. Capts. whilst so empld.:—Jan. 3rd.—From Instrs. (graded as Equipt. Officers, 2nd Cl.), School for Wireless Operators:—Temp. Lt. R. Cook, Gen. List; Lt. F. Murphy, Spec. Res. From Equipt. Officers, 3rd Cl.:—Temp. Lt. A. L. Wilson, Gen. List; Lt. S. Ransom, Spec. Res., March 1st; Temp. Lt. M. L. Horn, Gen. List, March 30th.

SCHOOLS OF INSTRN.—SCHOOL OF TECHNICAL TRAINING (MEN).—Co. Officers (graded as Equipt. Officers, 3rd Cl.).—Temp. Lt. J. S. Craig, R. Scots Fus., and to be transfd. to R.F.C. Gen. List; Lt. D. B. Martin, R.E., T.F.; Lt G. A.McMillan, Sco. Rif., T.F., and to be secd.; Temp Lt. J. More, R. Scots Fus., and to be transfd. to R.F.C. Gen. List; Lt. K. J. Falconer, Gordon Highrs., T.F., and to be secd.; Sec. Lt. W. H. Hume, Gordon Highrs., T.F., and to be secd.; Sec. Lt. O. Lawrence, Gordon Highrs., T.F., and to be secd.; Sec. Lt. J. M. Adams, Gordon Highrs., T.F., and to be secd.; Sec. Lt. A. Henderson, R. Scots Fus., and to be secd.; Sec. Lt. J. W. Mennie, Gordon Highrs., T.F., and to be secd.; Temp. Sec. Lt. R. C. Smith, attd. R. Scots Fus., and to be transfd. to R.F.C. Gen. List; Sec. Lt. A. E. T. Robinson, Gordon Highrs., T.F., and to be secd.; Sec. Lt. G. Thomson, Gordon Highrs., T.F., and to be secd., Feb. 27th; Temp. Lt. A. Duthie, Gordon Highrs., and to be transfd. to R.F.C. Gen. List; Temp. Lt. C. Kenyon, attd. Gordon Highrs., and to be transfd. to R.F.C. Gen. List, Feb. 28th; Temp. Sec. Lt. T. Smith, Lab. Corps, and to be transfd. to R.F.C. Gen. List, March 1st.

WAR OFFICE, April 29th.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING.—Wing Comdr.—Capt. (temp. Maj.) W. D. S. Sanday, D.S.O., M.C., Spec. Res., from a Sqdn. Comdr., and to be temp. Lt.-Col. whilst so empld. (March 21st, seny. March 12th).

Experimental Officers, 1st Cl.—(Graded as Equipt. Officers, 1st Cl.)—And to be temp. Capts. while so empld. (March 1st):—Lt. W. W. Stainer, R. Suss. R., T.F., from the 2nd Cl. (graded as an Equipt. Officer, 2nd Cl.); Temp. Lt. W. G. M. Nicholl, Gen. List from an Equipt. Officer, 2nd Cl.

SCHOOLS OF INSTRN.—WIRELESS SCHOOL.—Chief Instr.—(Graded as a Park Comdr.)—Lt. (temp. Capt.) R. P. J. M'Coy, Spec. Res., an Equipt. Officer, 1st Cl, and to be temp. Maj. while so empld. (Jan. 3rd).

Gen. List.—1st Cl. Air Mech. H. M. Bateson, from R.F.C., to be temp. Sec. Lt. (Feb. 25th).

Lt. J. H. Truscott, Devon. R., from a Flying Officer (Obsr.), to be temp. Capt. (with pay and allowances as Lt.) while actg. as Adjt. (Feb. 25th).

FROM THE COURT CIRCULAR.

WINDSOR CASTLE, April 26th.

The King and Queen, accompanied by the Princess Mary, and attended by Capt. B. Godfrey-Faussett. R.N., and the Earl of Cromer, visited the works of Messrs. Gordon Watney and Co., Limited, this morning. Their Majesties were received, and were conducted round the works, by the Hon. H. C. Butler, chairman; Maj. Gordon Watney, managing director; and the officials of the company.

Lt.-Col. I. B. Davson was also in attendance, representing the Aircraft Production Department of the Ministry of Munitions.

WINDSOR CASTLE, April 27th.

The King, attended by the Gentlemen in Waiting, went to London this morning.

His Majesty held a Council at Buckingham Palace at 10.45 o'clock. There were present:—The Lord Robert Cecil, M.P. (Minister of Blockade; acting for the Lord President), the Earl of Granard, the Lord Colebrooke (Captain of the King's Body Guard of the Hon. Corps of Gentlemen at Arms), and the Lord Southborough.

Previous to the Council the Lord Robert Cecil, M.P., was received in audience by the King, and on behalf of the Lord Rothermere surrendered the Seals of Secretary of State of the Royal Air Force and President of the Air Council.

At the Council his Majesty handed the Seals of Secretary of State of the Royal Air Force and President of the Air Council to the Right Hon. Sir William Weir, who took the Oath of Office and kissed hands upon his appointment.

The Right Hon. Sir William Weir had an audience of the King after the Council.

* * *

The following officer had the honour of being received by his Majesty, when the King invested him with the Insignia of the Distinguished Service Order and the Military Cross:—Major Fred Holliday, R.A.F.

* * *

His Majesty then conferred decorations as follows:—

THE MILITARY CROSS.—Maj. Alfred Ellis, A.F.C.; Capt. Adrian Cole, A.F.C.; Capt. Donald Day, Hampshire R. (also to receive the Distinguished Service Cross awarded to his brother, the late Flt. Sub-Lt. Harold Day, R.N.A.S.); Capt. Leslie Holden, A.F.C.; Capt. Allan Jones, A.F.C; Capt. Cecil King, R.A.F.; Capt. William O'Neill, Indian Army and R.A.F.; Lt. William Coates, A.F.C.

WINDSOR CASTLE, April 29th.

A party of Officers and Men of the United States of America Expeditionary Force were invited by The King and Queen to visit Windsor Castle to-day.

Major F. G. Noel (Royal Air Force) was present, and the Ladies and Gentlemen of the Household in Waiting were in attendance.

OFFICIAL COMMUNIQUES.

NAVAL.

ADMIRALTY COMMUNIQUÉS.

APRIL 24th.—Following the naval operation on the enemy's coast yesterday morning, observations were made by aircraft and bomb attacks carried out.

Observation was difficult owing to clouds, and on this account our machines descended as low as 50ft.

A clear break twenty yards wide was observed in the Zeebrugge mole at its inner end.

At Ostend a sunken object was seen lying between the piers and blocking the greater part of the fairway.

Numerous bombs were dropped on objectives on shore.

APRIL 27th.—On April 23rd, Durazzo was attacked by British air forces. The only man-of-war in the harbour was one gunboat. Our machines attacked the seaplane base, dropping nearly a ton of bombs, with apparently successful results

All our machines returned safely to their base.

MILITARY.

G.H.Q. COMMUNIQUÉS.

APRIL 23rd, 9.16 p.m.—On the 22nd inst. another useful day's work was done by our aeroplanes. Several long-distance reconnaissances were carried out, and many photographs were taken.

Our bombing machines were very active, and dropped 19 tons of bombs on numerous targets, including Thourout railway station, Engel ammunition dump, Warneton, Armentières, and Roulers.

The fighting in the air was not heavy, considering the fine weather and the amount of work done by our artillery reconnaissance and bombing machines. Seven hostile aeroplanes were brought down, and six others driven down out of control. In addition, one German machine was shot down in our lines by our anti-aircraft fire, and two hostile balloons were destroyed by our aeroplanes.

Three of our machines are missing.

APRIL 24th, 8.47 p.m.—On the 23rd instant the weather was not very favourable for flying until 5 p.m., after which hour some sharp fighting took place in the air.

Low reconnaissances and artillery work were carried out throughout the day, and Merville, Estaires, Steenwerck, La Gorgue, Chaulnes railway junction, and the docks at Ostend were heavily bombed.

Fourteen hostile machines were brought down and two others driven down out of control. Another German machine was brought down in our lines by our anti-aircraft fire.

One of our aeroplanes is missing.

During the night flying squadrons dropped over 20 tons of bombs on different targets, including Roulers, Merville, Armentières, Bapaume, the railway station at Chaulnes, Thourout, Tournai, Courtrai, and the docks at Zeebrugge. Direct hits were obtained on all these targets; in several cases fires were started.

All our machines returned.

APRIL 25th, 9.7 p.m.—On the 24th instant mist again hampered work in the air.

Our aeroplanes on the southern part of the British front carried out several low reconnaissances, and engaged the enemy's attacking troops in the neighbourhood of Villers-Bretonneux with bombs and machine-gun fire from a very low height.

Two hostile machines were brought down in combat and another was shot down in our lines by our infantry.

Two of our machines are missing.

During the night the southern portion of the front was covered in mist, and our machines were unable to leave the ground

In the north, however, five and a half tons of bombs were dropped by us on Estaires, Armentières, Roulers, and the railway stations at Courtrai and Thourout.

All our machines returned.

April 26th, 9.10 p.m.—On the 25th inst. mist during the morning and thunderstorms later in the day prevented much flying being accomplished until the evening.

In the northern area, however, the enemy's positions in the neighbourhood of Kemmel were reconnoitred by our machines, our pilots being compelled to fly within a few feet of the ground in order to make observation possible.

Six hundred and fifty bombs were dropped by us on Menin, Roulers, Armentières, and on the enemy's billets.

Ten hostile machines were brought down in air fighting, and two others were driven down out of control. Four other German machines were shot down by anti-aircraft gunfire and one by fire from our infantry.

Two of our machines are missing.

April 27th, 7.15 p.m.—On the 20th inst., except for low reconnaissances of the battle front, little flying was possible owing to thick mist.

Two low-flying German aeroplanes were brought down by our infantry.

None of our machines is missing.

April 28th, 8.20 p.m.—On the 27th instant thick fog again prevented flying, except for a few low reconnaissances of the battle front.

Only two flights took place, in one of which a hostile machine was brought down.

None of our machines is missing.

April 29th, 7.55 p.m.—Beyond carrying out one or two low-flying reconnaissances and dropping a few bombs on various targets, our aeroplanes were unable to do any flying on the 28th inst. on account of low clouds, mist, and rain.

War Office Communiqués.

April 27th.—The G.O.C. Macedonia reports:—

On April 21st a hostile aeroplane was driven down out of control near Barakli-Dzuma (south-west of Demir-Hissar).

April 27th.—The G.O.C. Mesopotamia reports:—

On April 21st one of our aeroplanes brought down a hostile machine; the occupants, both of whom were German, were killed.

April 28th.—The G.O.C. Macedonia reports:—

A bombardment was carried out by the British Air Service upon enemy encampments around Demir Hissar and Serres.

THE CASUALTY LIST.

NAVAL.

Reported April 29th.

Killed.—McNichol, E. J. L., Air Mech., 2nd Gr., F29069; Pool, E. C., Actg. Air Mech., 1st Cl., F12787; Rouse, J., Air Mech., 2nd Gr., F50269; Wilkinson, C. A., Air Mech., 2nd Gr., F26703.

Wounded.—Deighton, D., Actg. Air Mech., 1st Gr., F19791; Eldred, G. P., Air Mech., 2nd Gr., F47354; Frew, R. J., Air Mech., 2nd Gr., F39638; Goodwin, R. G., Air Mech., 2nd Gr., F52189; Humphreys, A. J., Air Mech., 1st Gr., F13698; Hutton, J. S., Air Mech.; Price, A. H., Actg. Air Mech., 1st Gr., F19846; Trippier, F., Air Mech., 1st Gr., F12814; Warrington, G., Actg. Air Mech., 1st Gr., F26702.

Reported April 30th.

Zeebrugge Raid.

Missing, believed Killed.—Brock, Lt.-Col F. A., R.A.F. (Act. Wing Comdr., R.N.).

MILITARY.

Reported April 24th.

Previously reported Missing, now reported Killed.—Butler, Sec. Lt. H., R.F.C.
Chuter, Lt. H. A., Royal Fus., attd. R.F.C.
Erskine, Capt. R., R.F.C.
Gaisford, Lt. R. S., R.F.A., attd. R.F.C.
Kent, Sec. Lt. P. F., R.F.C.
Reade, Sec. Lt. A. B., R.F.C.
Ross, Sec. Lt. D. W., R.F.C.

Wounded.—Moseley, Sec. Lt. G. F., R.F.C.; Richardson, Sec. Lt. E. A., R.F.C.

Previously reported Prisoner, now reported Died of Wounds as Prisoner in Austrian Hands.—Gore, Sec. Lt. F. D. C., R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Crammond, Sec. Lt. G. R., Lan. Fus., attd. R.F.C.
Duke, Lt. R. E., R.F.C.
Edmonds, Sec. Lt. E. P. P., R.F.C.
Luxmoore, Capt. F. L., R.F.C.
Matson, Lt. A. W., R.F.C.
Taylor, Sec. Lt. A. L. T., R.F.C.
Taylor, Sec. Lt. W. H., R.F.C.
Wells, Sec. Lt. N. B., R.F.C.
Wigan, Sec. Lt. A. P. C., R.F.C.

Reported April 25th.

Previously reported Missing, now reported Killed.—Moore, Lt. L. W. B., R.F.A., attd. R.F.C.

Missing.—Jerrard, Lt. A., S. Staff. R., attd. R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Clarke, Sec. Lt. A. F. G., A.S.C., attd. R.F.C.

Reported April 27th.

Killed.—Monk, Capt. E. W., Lond. R., attd R.F.C.

Previously reported Missing, now reported Killed.—Lennox, Sec. Lt. A. D., R. Sco. Fus., attd. R.F.C.
Luchford, Capt. H. G. E., M.C., R.F.C.
Paul, Sec. Lt. A. R., R.F.C.
Pearson, Lt. C. W., Northd. Fus., attd. R.F.C.

Wounded.—Fraser, Sec. Lt. A. W., R.F.C.; Roulstone, Capt. A., M.C., R.F.C.; Sharp, Lt. J. G., M.C., R.G.A., attd. R.F.C.

Missing.—Carbines, Sec. Lt. H., Lpool. R., attd. R.F.C.; Pedon, Sec. Lt. J. K. von I., R.F.A., attd. R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Newbury, Sec. Lt. G. G., R.F.C.
Norman, Sec. Lt. G. R., R.F.C.
Smith, Sec. Lt. R. B., R.F.C.

Canadian Force.—Wounded.—Dennistoun, Maj. J. A., Man. Regt., attd. R.F.C.; McLachlan, Lt. A. H., Can. Rly. Troops, attd. R.F.C.

Missing.—Agar, Capt. E. Z., Alta. Regt., attd. R.F.C.; Dean, Lt. A. C., Cent. Ont. Regt., attd. R.F.C.; McCann, Lt. C. M., Can. M.G.C., attd. R.F.C.; Mercer, Lt. G. A., Can. Cyc. Corps, attd. R.F.C.

Reported April 29th.

Previously reported Missing, now reported Killed.—Taylor, Sec. Lt. T., R.F.C.
Watson, Sec. Lt. T., R.F.C.

Australian Force.

Accidentally Killed.—Hay, Sec. Lt. C. W., A.F.C.

Missing.—Courtney, Lt. J. C., A.F.C.
Woolhouse, Lt. F. S., A.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Flight, Sec. Lt. O. T., A.F.C.

Reported April 30th.

Prisoner in German Hands.—Thompson, Lt. J. C., Shrops. L.I., attd. R.F.C.

Previously reported Missing, now reported Prisoners in German Hands.—Falkenberg, Sec. Lt. G. D., R.F.C.
Gray, Sec. Lt. W. M. R., R.F.C.

Australian Force.—Wounded.—Brettingham-Moore, Lt. G. R., A.F.C.

Missing.—Love, Lt. H. K., A.F.C.

Canadian Force.—Died of Wounds.—Sworder, Lt. N., B. C. Regt., attd. R.F.C.

Wounded.—Barry, Lt. G. A., Que. Regt., attd. R.F.C.

Casualties Among N.C.Os. and Men.

The Dates are those of the Official List.

Killed.

April 15th.—R.F.C.—Cruickshank 402799 Cpl. J. A. (Aberdeen); Pierson 80674 3rd Cl. Air Mech. A. (St. Heliers); Short 53657 2nd Cl. Air Mech. J. (Leith); Thomson 99631 2nd Cl. Air Mech. J. (Edinburgh).

April 16th.—R.F.C.—Hurrell 103996 2nd Cl. Air Mech. J. H. (Bush Hill Park, N.).

Died of Wounds.

April 15th.—R.F.C.—Hill 55350 2nd Cl. Air Mech. E. (Cricklewood, N.W.).

Died.

April 15th.—R.F.C.—Daniels 80023 1st Cl. Air Mech. W. (Denton); Hogg 104078 2nd Cl. Air Mech. J. W. (Sunderland); Mallett 25391 2nd Cl. Air Mech. C. (Birmingham).

April 16th.—Jewers 5838 Flt. Serjt. W. H. (Datchett).

Wounded.

April 15th.—R.F.C.—Bushell 112184 3rd Cl. Air Mech. A. (Vauxhall, S.E.); Connolly 18230 1st Cl. Air Mech. J. (Tottenham, N.); Doodson 15212 Serjt. F. (Shipley); Everton 84095 Serjt. A. (Kingsland, N.); Holling 99623 2nd Cl. Air Mech. G. (Barnsley); Lake 107798 Serjt. J. (Downham); Lowe 114690 Serjt. J. C. (Edinburgh); Williams 69900 3rd Cl. Air Mech. S. (Mile End, E.).

April 18th.—Blair 64937 1st Cl. Air Mech. H. (Kilbride); Bone 44259 2nd Cl. Air Mech. L. T. G. (Bow, E.); Broome 9707 1st Cl. Air Mech. W. (Neasden, N.W.).

Missing.

April 15th.—R.F.C.—Long 67775 Serjt. L. S. (Hackney, E.).

Australian Imperial Force.

Died of Wounds.

April 16th.—A.F.C.—Dewhurst 723 E. B.

Wounded.

April 19th.—A.F.C.—Sinclair 1854 W.

Aircraft Steels.

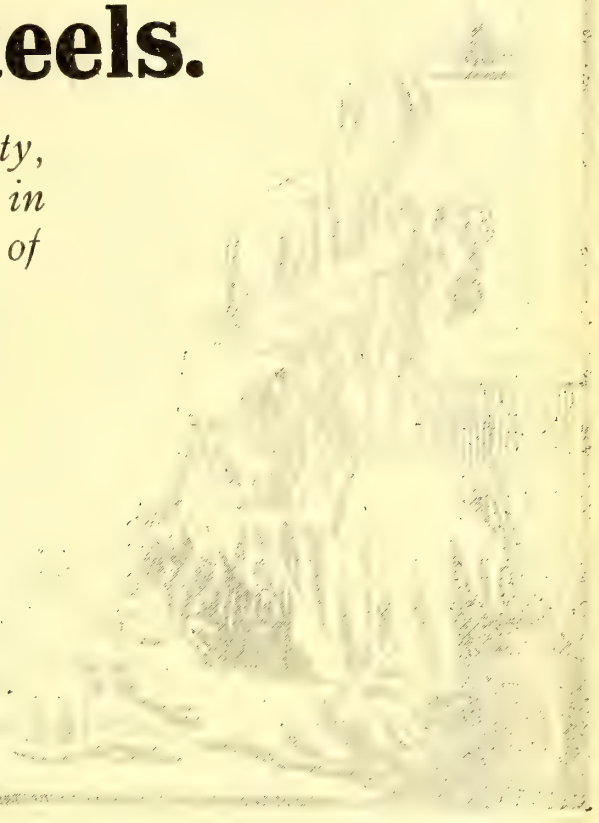
In all cases of difficulty, consult the expert staff in Research Laboratory of

Edgar Allen & Co. Ltd.
Imperial Steel Works, Sheffield.

Every assistance gladly given.

Allen's High-Tensile Steel.
Allen's Bullet-Proof Aircraft Plates.
Allen's Valve-Steel for Aeroplane Engines.
All Motor and Aircraft Steels.

WRITE FOR CATALOGUE D.



GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE,

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

"GWYNNE, LONDON."

The following officers, who were prisoners in Germany, have arrived in Holland for internment:—

Adams, Sec. Lt. F., R.F.C.; Alexander, Lt. E. H. E. J., K.O. (Yorks L.I.), attd. R.F.C.; Burnie, Sec. Lt. A. I., Buffs (E. Kent R.), attd. R.F.C.; Collier, Sec. Lt. A. C., K. O. (R. Lan. R.), attd. R.F.C.; Formilli, Capt. G. C., R.G.A., attd. R.F.C.; Grantham, Lt. V. M., R.F.C.; Kemp, Lt. H. T., Ches. R., attd. R.F.C.; McEwen, Lt. J. G., R.F.C.; Mansell-Moullin, Lt. O., R.F.C.; Porter, Capt. G. T., R.F.A., attd. R.F.C.; Russell, Lt. A. L., R.F.C.; Slade, R. J., A.C.C., attd. R.F.C.; Somervell, Lt. W. E., R.F.C.; Wilkin, Sec. Lt. B. O., D. of Corn. L.I., attd. R.F.C.; Wilson, Capt. C. B., M.C., Hussars, attd. R.F.C.

AIR FORCE.

Reported April 27th.

Killed.—Adam, Lt. O. P., R.A.F.
Banbury, Lt. F. E., Gen. List and R.A.F.
Christie, Sec. Lt. D., Gen. List and R.A.F.
Jacob, Lt. C. G., Gen. List and R.A.F.
Jones, Lt. E. D., Gen. List and R.A.F.
Smith, Sec. Lt. W., E. Lancs. R., attd. R.A.F.
Spier, Sec. Lt. Gordon, Gen. List and R.A.F.
Stonehouse, Lt. R., A.S.C. (T.F.), attd. R.A.F.
Swain, Sec. Lt. C. M., Gen. List and R.A.F.
Swaine, Sec. Lt. S. W., R.F.A., attd. R.A.F.
Wilson, Sec. Lt. Cecil, Gen. List and R.A.F.

Wounded.—Brown, Lt. C. H., Lpool. R. (T.F.), attd R.A.F.; Brown, Sec. Lt. D. G., Gen. List and R.A.F.; Baird, Sec. Lt. J. Y., Sco. Rif. (T.F.), attd. R.A.F.; Gaynor, Sec. Lt. G. J., S. Irish Horse, attd. R.A.F.; Hardy, Sec. Lt. P., Gen. List, attd. R.A.F.; Lewis, Sec. Lt. H. V., S. Wales Bord. and R.A.F.; MacLean, Lt. D., Gen. List and R.A.F.; Sweeting, Sec. Lt. A. E., Gen. List and R.A.F.

Accidentally Injured.—Smith, Sec. Lt. R., Gen. List and R.A.F.

Missing.—Betley, Sec. Lt. E., R.G.A. (S.R.), attd. R.A.F.; Coleman, Sec. Lt. C. B., Oxf. and Bucks L.I., attd. R.A.F.; Hart, Lt. W. C. F. N., R. Lancs. R., attd. R.A.F.; McPherson, Sec. Lt. B., Gen. List and R.A.F.; Pearce, Sec. Lt. E. S. C., Gen. List and R.A.F.; Robinson, Capt. P. D., M.C., R.F.C. (S.R.); Taylor, Sec. Lt. J. B., Gen. List and R.A.F.; Trollip, Sec. Lt. D. P., Gen. List and R.A.F.

PERSONAL NOTICES.

NAVAL.

Deaths.

BROCK.—Frank Arthur Brock, Sqdn.-Comdr. R.N.A.S., who was killed in the attack on the Mole at Zeebrugge, was the eldest son of Mr. Arthur Brock of the firm of C. T. Brock and Co., whose name is known all over the world as firework manufacturers. He was born in 1884, and was educated at Dulwich College, later entering the family business, of which he became a director. At the beginning of the war he joined the R.N.A.S., and distinguished himself in connection with the raid on Friedrichshafen. Later he became a pilot, and won rapid promotion.

In 1916 he was gazetted flight-commander, and soon afterwards became acting squadron-commander. His special knowledge of explosives and his inventive ability were employed to good purpose. For some time he was connected with the Inventions Board, under Lord Fisher. In recognition of his valuable services he was given the O.B.E. last January.

His last technical service to his King was mentioned in Parliament last week, when the First Lord of the Admiralty ascribed to him the devising of the smoke screen, under cover of which the attack on Zeebrugge was delivered.

He was a good all-round sportsman, excelling in football and boxing, and was a good rifle and game shot. His love of adventure is shown by the fact that when, in organising the Friedrichshafen affair, Lt. Pemberton-Billing was looking for volunteers for a certain part of the work, on the conditions that they would come with him, obey orders, and ask no questions till the job was done, Frank Brock at once volunteered, although 22 other good men had previously been asked and had refused.

He made good then, on his first duty in the King's service, and he made good in his last. He made good all through, and he died fighting. None can wish for a better record.

KING.—Lt. Vernon King, Royal Marines, attd. R.A.F., who was killed in the air on April 11th, aged 31, was the youngest son of Mr. and Mrs. W. J. King, of Gravesend. He was educated at the Gravesend Proprietary School, Grays College, and Guelph Agricultural College, Canada, where he graduated as B.S.A. He accepted a Government appointment as entomological expert for agricultural work in Kansas, U.S.A., but relinquished it on the outbreak of war to return to fight. He saw service in Egypt, Lemnos, and France. In September, 1917, he transferred to the R.F.C., and gained his observer's wing.

PARKINSON.—Flt. Lt. George Robert John Parkinson, R.N., who was killed whilst on patrol duty on April 13th, was the only son of the late Dr. Parkinson and Mrs. Parkinson, of Portland Cottage, Henley-on-Thames. He was 19 years of age.

Engagement.

DURSTON—VEREKER.—The engagement is announced between Flt. Comdr. A. Durston, R.N.A.S., and Vera Vereker, of Nettlestone House, Isle of Wight.

MILITARY.

Deaths.

BALFOUR.—Lt. Bernard Balfour, London Reg. and R.A.F., son of Mr. and Mrs. A. H. Balfour, 41, Merton Hall Road, Wimbledon, S.W., was killed on April 16th, in his 21st year. Educated at King's College School, he was a sergeant in the O.T.C. when war broke out and captain of the shooting eight. He obtained a commission in the London Regiment in March, 1915, went to France in June, 1916, and joined the Royal Flying Corps in November of that year while in France as an observer. He served as such till June, 1917, and obtained his pilot's certificate in August, 1917. On gaining this he again proceeded to the front, remaining there until he was killed flying on patrol duty. He was a good all-round sportsman, being in the school fifteen at football, and a good swimmer and tennis player.

BEGBIE.—Lt. S. C. Hamilton Begbie, E. Surr. Regt., attd. R.A.F., was killed in action in the air on April 21st, aged 20. He was the only child of Mr. and Mrs. Sydney D. Begbie, of Hill Head, Fareham, Hampshire, and late of Richmond Hill, and was educated at Bowden House, Harrow, Charterhouse, and Switzerland. He obtained his commission at 17, and saw active service on the Somme in 1916, returning to the front in 1918 at his own request. His father, Mr. Syd Begbie, was, in his time, a well-known sportsman, and his name is familiar as managing director of the Aster Engineering Co., Ltd. His many friends in the Aircraft Industry will offer him and his wife their very deep sympathy.

CANN.—Sec. Lt. P. R. Cann, R.F.C., who died on April 5th in hospital abroad, of wounds received in action on April 1st, was the younges son of Mr. and Mrs. Fred Cann, of Bude.

DENT.—Lt. Edgar Dent Dent, Irish Guards, who was killed on April 12th, aged 27, was the only son of Mr. and Mrs. Alfred Dent, of 55, Lee Park, Blackheath, Kent. He was trained from earliest boyhood in rifle shooting, and began a remarkable record when a Public School Cadet. This brought him under the personal notice of the late Lord Roberts, from whom he received great encouragement. In addition to many other successes, at Bisley and elsewhere, when reaching the age of 17, and thereby eligible to compete in "The King's," he tied for a place in the "300," and was ultimately placed 303rd out of 1,480 picked shots from all parts of the Empire. He received his first commission in 1907 in the 3rd V.B. Royal West Kent Regiment. Before the outbreak of the war in 1914 he had joined the Reserve Battalion, Royal Dublin Fusiliers. From the Royal Dublin Fusiliers he was posted to the 1st Royal Irish Rifles, with whom he was at Fromelles in 1915. A few weeks later he was dangerously wounded at Fleurbaix, and after recovery was transferred to the R.F.C., and obtained his wings. In 1916 he went to East Africa, but had to return for a surgical operation. He subsequently resumed duty at home with the R.F.C., and on recovery from an attack of appendicitis he joined the Irish Guards. In 1915, he married Isobel, second daughter of Mr. and Mrs. R. McNab, of Old Charlton, Kent.

HARKER.—Sec. Lt. Edward Keith Harker, R.G.A., attd. R.A.F., who died of wounds on April 18th, was the elder son of Edward and Annie Harker, Berkhamsted. He was 20 years old.

HERRON.—Lt. Kenneth Chester Herron, Yeo., attd. R.A.F., of Wickham Place, Witham, Essex, youngest son of the late George Oliver Mellick Herron, and of Mrs. Janson, of Newdigate Place, Newdigate, Surrey, was killed on April 24th, aged 37. He was educated at Bradfield College and abroad, and obtained a commission in the Yeomanry in Jan., 1915, and went to France in July, 1916. He transferred to the R.F.C. last August. Mr. Herron leaves a widow.

IPSWICH.—William Henry Alfred Fitzroy, Viscount Ipswich, Coldstream Guards and R.A.F., only son of the Earl of Euston, and grandson of the Duke of Grafton, was killed while flying in Wiltshire on April 23rd.

Lord Ipswich, who was 33 years old, was educated at Harrow and Trinity College, Cambridge. He served with the Coldstream Guards in France, and was wounded. He married, in 1913, Auriol Margaretta, only child of Major Brougham, of Potterspury House, Northamptonshire, and leaves a son, born in 1914, who becomes second heir to the dukedom, and a daughter.

Viscount Ipswich went from Cambridge to Wye Agricultural College. Afterwards he accepted an appointment in an agricultural company in Egypt and was for several years engaged in land reclamation there. On the outbreak of war he was on the staff of Wye College and at once enlisted in the East Kent Regiment. Shortly afterwards he was given a commission in the Coldstream Guards and was sent to France early in November, 1914. In the spring of 1915 he was invalided home with shell-



A GREAT SCOT AND THE LITTLE FARM HE WELL TILLED!

A REAL TONIC

AFTER THE NIGHTMARE THROUGH WHICH WE ARE PASSING WILL BE A MOTOR TOUR THROUGH THE LAND O' BURNS! IF YOU HAIL FROM THE SOUTH, YOU HAVE NOT SEEN BONNIE SCOTLAND UNTIL YOU HAVE VIEWED THE BURNS COUNTRY FROM A POST-WAR A.-J. CAR. BOTH LANDSCAPE AND CAR ARE ENCHANTING!

Arrol-Johnston Ltd.
DUMFRIES.

"Always at the Front!"

BLACKBURN Propellers
and Metal Fittings

The BLACKBURN AEROPLANE and MOTOR CO., LTD. LEEDS and HULL.

Contractors to the AIR COUNCIL.

Blackburn AIRCRAFT

shock and did not return to France until the summer of 1916. In the autumn of last year he returned to England to train as an observer in the Royal Flying Corps, and obtained his wing in February of this year. Though considerably above the recognised age-limit, he passed on to a pilot's course and met his death almost at the completion of his period of training.

LUCHFORD.—Capt. Harry George Ernest Luchford, M.C., R.F.C., whose death is officially reported, was the eldest son of Mr. and Mrs. George J. Luchford, of Bromley, Kent. On the outbreak of war he was engaged as a clerk in Martin's Bank, Lombard Street, E.C. He enlisted almost immediately in the Norfolk Regiment, and received his commission in the A.S.C. in September, 1914. He served in France with the Indian (Meerut) Divisional Cavalry from Dec., 1914, to Jan., 1916; was transferred to the R.F.C., and qualified as a pilot on May 19th, 1917, and proceeded at once to the front, where his successes obtained recognition by the award of the M.C. and Bar. He is said to have brought down 27 enemy machines.

MADELEY.—Sec. Lt. Claude Neville Madeley, R.F.C., who was killed during a combat in the air on Jan. 19th, was the youngest son of the late William Madeley, of Worcester, and Mrs. Madeley, of Sherrington House, Kingston-on-Thames. He was born at Worcester in 1894, and was educated at Wimbledon College, afterwards joining the Polytechnic Engineering School and gaining the bronze medal in his last year for motor engineering. In January, 1914, he went to the Westinghouse Engineering Works, Manchester. When war broke out he enlisted in a field company of the Royal Engineers, being transferred later to a signal company. He was with the 11th Division at the historical landing at Suvla Bay, and also at the evacuation. After some time spent in Egypt he was ordered to France, where he was made a corporal, subsequently becoming a dispatch rider. In May, 1917, he returned to England and received a commission in the Royal Flying Corps, and returned to the front as a qualified pilot in December.

McCUDDEN.—Sec. Lt. J. A. McCudden, M.C., R.F.C., who was reported missing a month ago, is now officially stated to have been killed. Mr. McCudden was a brother of Capt. J. Byford McCudden, V.C., D.S.O., M.C. It is with deep regret that one records the death of Mr. McCudden, who followed so well his brother's fine example. He had done remarkably good work, and is reported to have destroyed 11 enemy aeroplanes. He was awarded the Military Cross only a few weeks ago, the award being gazetted on April 22nd, the day before his death was announced.

RAYMOND-BARKER.—Maj. Richard Raymond-Barker, M.C., R.A.F., who was killed in aerial action on April 20th, was the son of Edward and Rose Raymond-Barker, of Bisley, Gloucestershire. He was 23 years of age.

READING.—Sec. Lt. V. J. Reading, R.F.C., reported missing on March 26th, is now unofficially reported to have been killed, aged 22. He was the only son of Mr. A. Y. Reading, Knodishall Lodge, Suffolk, and was educated at Woodbridge Grammar School. His commanding officer writes: "During the great offensive he did good work, brought back reports of the highest value, bombed and machine-gunned enemy troops in a way that one could not but feel the greatest admiration for his initiative and courage."

REECE.—Capt. Frederick Bennett Reece, R.E., attd. R.A.F., who died on April 20th at a military hospital from wounds, was the third son of the late Samuel Reece, and of Mrs. Reece, Highfield, Wallasey.

SAUNDERSON.—Capt. Samuel Treherne Saunderson, R.A.F., who was killed in a flying accident, was the husband of Florence Saunderson, 19, Cliveden Place, S.W. He was a member of the Special Cavalry Reserve who had joined the Air Service, and was appointed flight commander in October, 1915.

SHEIL.—Lt. Charles Sheil, R.A.F., killed on April 22nd, was the youngest son of Mr. and Mrs. R. H. Sheil, of 24, Burlington Road, Dublin. In September, 1914, he joined the famous "D" company of the Royal Dublin Fusiliers, and served with them in Gallipoli, where he was wounded for the first time. He rejoined in time to take part in the retreat in Serbia, and remained with the remnants of the 10th Division at Salonika until he obtained a commission in the 1st R. Munster Fus., with whom he served in France from March, 1917. When leading his platoon at the Messines-Wytschaete battle on June 7th he was wounded for the second time. He remained with the R. Munster Fus. until Nov., 1917, when he joined the R.F.C., and having completed his training went to the front early this year. He was mentioned in dispatches and awarded the Parchment Certificate for gallant conduct and devotion to duty in the field.

SMITH.—Lt. Ralph Eustace Smith, R.A.F., whose death in action is just announced, was the second son of the late Eustace Smith, of Benton House, near Newcastle-on-Tyne, and a grandson of the late Thomas Eustace Smith, of Gosforth Park, for many years M.P. for North Shields and Tynemouth. He joined a battalion of the Northumberland Fusiliers as Second Lieutenant on the outbreak of war, and was later transferred to the Northumberland Hussars, with whom he served for some time in France. Last autumn he joined the R.F.C., and up to the time of his death had been acting as an observer in a night-bombing machine, having been specially mentioned for his good work. Mr. Smith was a director of Thomas and William Smith, Ltd., of Newcastle, and of Smith's Dock Co., Ltd., of North and South Shields and Middlesbrough. He married a daughter of Mr. Edward Joicey, of Blenkinsopp, and leaves a widow and two children.

WINMILL.—Lt. Westropp Peyton Winmill, Bedfordshire Regt., who was attd. R.F.C. for 20 months, was killed in action on March 22nd. He was the eldest son of the late Geo. Winmill and of Mrs. Winmill, Bedford, and husband of Myfanwy Winmill, Reading, and was 23 years of age.

Engagements.

CARTER—RYE.—The engagement is announced of Lt. Albert Carter, M.M., R.A.F., of Calgary, Canada, to Hilda Gertrude, younger daughter of Mr. and Mrs. H. W. Rye, of Folkestone, Kent.

EMPSON—PATTERSON.—The engagement is announced of Lt. Ralph H. W. Empson, D.L.I. and R.A.F., and Mabel Elizabeth, youngest daughter of Dr. and Mrs. John Patterson, of The Green, Ramelton, Co. Donegal.

PATRICK—GROSS.—An engagement is announced between Maj. C. K. Cochran Patrick, D.S.O., M.C., R.A.F., and Ella, daughter of Mrs. Sydney Gross, of Gloucester House, Park Lane.

WILLIAMS—MACARTHY.—A marriage has been arranged,

INDISPENSABLE TO THE FLYING MAN

CROSBY LOCKWOOD & SON. 7 Stationers' Hall Court, E.C. 4.



PYROMETERS

For Heat Treatment of all parts of Aeroplanes and Aeroplane Engines.

Radiation Pyrometers, catalogue P. 17.
Thermo-couple Pyrometers and Electrical Resistance Thermometers, catalogue P. 19.
Post Free on Request.

FOSTER INSTRUMENT CO.,
LETCHWORTH, HERTS, ENG.



PRESS-WORK & SPINNINGS

and Sheet Metal (War) Work generally.

The LONDON ALUMINIUM Co., Ltd., Aircraft Dept., Westwood Road, Aston, B'ham. 'Phone: East 497.



THE
LODGE
PLUGS

are unequalled for all types of aircraft engines.

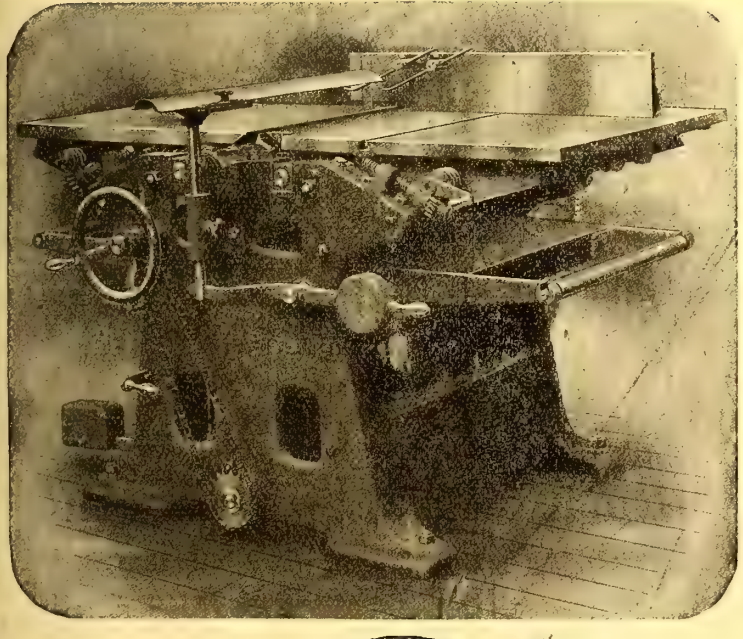
There are a dozen different designs of Lodge Aero Plugs.

One model may be unsuitable for one type of engine, though highly satisfactory for another.

All Lodge Aero Plugs for ***rotary*** engines, for instance, are totally different to those made for ***stationary*** cylinder engines

We can help you with our specialised experience in plugs for aircraft engines.

MADE IN ENGLAND
BY
THE LODGE SPARKING PLUG CO., LTD.,
RUGBY.
(Controlled Establishment.)



AIRCRAFT MACHINERY

Hand and Power Feed Planer

FOR

SURFACING, THICKNESSING,
PLANING OUT OF WIND,
—JOINTING, REBATING,—
BEVELLING & CHAMFERING

Type ME.

WRITE FOR PARTICULARS.

Thos. Robinson & Son LIMITED
ROCHDALE

and will shortly take place, between Mr. W. Cay Williams, Leicestershire Regt., attd. R.A.F., and Mona, youngest daughter of Mr. and Mrs. Leonard Macarthy, Benwell Park, Newcastle-on-Tyne.

MARRIAGES.

CHALMERS—CRAN.—On April 26th, at St. Andrew's Parish Church, Edinburgh, Lt. Edward Ernest Chalmers, R.F.A. and R.A.F., eldest surviving son of the late Rev. John Chalmers, minister of the parish of Ashkirk, and of the late Mrs. Chalmers, 1, Grange Terrace, Edinburgh, was married to Isabella Donaldson, eldest daughter of John Cran, Esq., Backhill House, Carberry, Inveresk, by the Rev. William Edie, minister of the parish church of St. Michael Inveresk.

NICHOL—GELLATLY.—On April 20th, at St. Paul's Church, Cliftonville, Margate, Capt. E. F. Nichol, M.C., Loyal North Lancashire Regt. and R.A.F., youngest son of Dr. and Mrs. Nichol, of Margate, was married to Edith Frances, younger daughter of Mr. and Mrs. P. F. Gellatly, of Margate, by the Rev. E. W. Taloy Jones, assisted by the Vicar, the Rev. Herbert Pegg.

BIRTHS.

GREENSHIELDS.—On April 27th, at 16, Helenslea Avenue, Golder's Green, to Doris (née Emblow), wife of Lt. J. W. Greenshields, Essex Regt. and R.A.F.—a son.

HARBORD.—On April 26th, 1918, at 40, Upper Fitzwilliam Street, Dublin, the wife of Capt. K. B. Harbord, R.F.A. and R.F.C., of a son.

JARVIS.—On April 26th, at 34, Albert Road, Regent's Park, Evelyn Mary, the wife of the late Capt. Ralph H. Jarvis, M.C., R.F.C., of a daughter

---

Capt. Sydney Philip Smith (Flight Commander), R.F.C., has been missing since April 6th. Information is earnestly desired by Mr. and Mrs. Arthur Smith, Morningside, Aldershot.

* * *

Mrs. Tilney hopes that all those who wrote such kind letters to her on the death of her son, Major Leonard A. Tilney, M.C., Household Cavalry and R.F.C., in aerial action on March 9th, will forgive her delay in answering. She hopes to do so in time and in the meanwhile is deeply grateful for all the sympathy extended to her and Colonel Tilney.

* * *

Sec. Lt. J. B. Welman, R.F.C., was taken prisoner on October 31st, 1917. If the next-of-kin of other prisoner officers receive news of him will they kindly communicate with Mrs. Johnson, 87, Kensington Gardens Square, London?

AIR FORCE.

DEATHS.

BENNETT.—At an inquest held by an Eastern Countie coroner on April 27th, on the body of Lt. Owen Hewitt Dampie Bennett, R.A.F., who belonged to Birmingham, a brother office described the collision which resulted in the death of the de ceased. He said he was up about 700 ft. when deceased flev over him between 300 ft. to 400 ft. higher, and suddenly fell Witness tried to get out of his way, but had not sufficient spee to get clear. The nose of his machine jammed in the under ca riage of deceased's machine, and they locked together. Bot machines rolled over and over for 300 ft., when witness's machin broke adrift, smashing the lower planes of the other machin which crashed to the earth. Witness came out of the lock in dive, and then planed down. Dr. Weir, a naval surgeon, sai deceased had a broken back and other injuries.

A verdict of accidental death was returned.

BLACK.—Lt. Donald Curdie Black, of Mount Morat, Victori died on April 23rd as the result of an aeroplane accident.

CHANDELIER CHAIN

FOR ALL PURPOSES.



Dozens of Sizes. Buy from Actual Makers.

Also all kinds of
PRESSINGS, STAMPINGS & PIERCINGS.

SMITH AND DAVIS, LIMITED.
BRASSFOUNDERS, BIRMINGHAM.

Aeroplane Steel Sheets

as supplied by us to

The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.
IRON AND STEEL WAREHOUSE
SMETHWICK, BIRMINGHAM

Telegraphic Address: "Bernico," Birmingham. Telephone No. 224 Smethwick.

AEROPLANE GENERAL SUNDRIES, LTD.

OWING to an adverse legal decision we are no longer able to use our well-known block embodying the initials of our name———but ———

We can still supply you with

A.G.S. Parts

All kinds of small Turning and Repetition Work carried out at short notice.

Telephone—
Holborn 4959.

Telegrams—
Zeppiskout,
Holborn,
London.

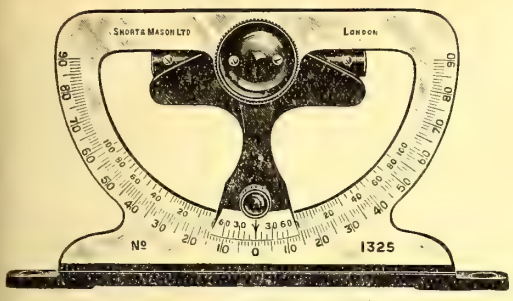
Registered Office—
FULWOOD HOUSE,
FULWOOD PLACE
HIGH HOLBORN,
LONDON, W.C.

NOTICE TO AEROPLANE WORKS.

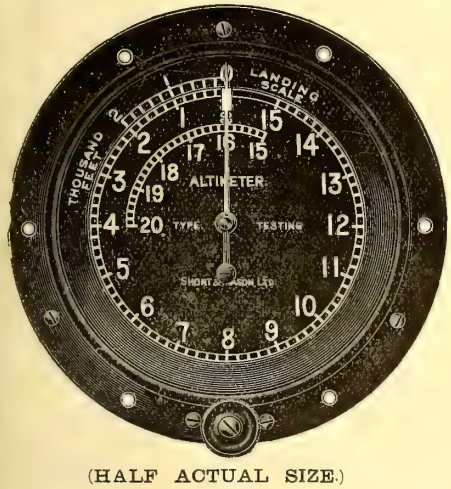
SUPPLIES OF 'CROID' LIQUID GLUE.

The necessary additional plant having been obtained, the output of "CROID" Liquid Glue for Aircraft Construction, etc., has now been largely increased, and delays in the despatch of supplies will not, it is anticipated, arise from shortage, as has lately been the case.

THE IMPROVED LIQUID GLUES COMPANY, LTD
Great Hermitage Street and Bushell Street, London, E.1.
Telephone: Avenue 3178 Telegrams: Exoroiden, 'Phone, London.



(HALF ACTUAL SIZE.)



(HALF ACTUAL SIZE.)

"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES
TO CLOSE LIMITS DURING

ASSEMBLING AND CONSTRUCTION.

HEIGHT MEASURING

ANEROID ALTIMETERS

FOR EVERY TYPE OF

AIRCRAFT

MANUFACTURED BY

SHORT & MASON, Ltd.,

ANEROID WORKS,
WALTHAMSTOW, LONDON, E.17.

Telegrams: "Aneroid, Phone, London."
Telephone: Walthamstow 180.

To Works Managers and Buyers.—**S.T.S.**

SMALL TOOLS, Ex Stock.

PROMPT DELIVERIES.

Scroll Chucks.	High Speed Twist Drills	Milling Cutters.
Independent Chucks	Carbon Twist Drills.	Slitting Saws.
Drill Chucks.	Hand & Machine Reamers.	Taps and Dies.
Die Heads.	Centre Drills.	Shell Reamers.

Quick Grip and Parallel Bench Vices, Machine Vices, Hand Screwing Machines.

WE GIVE PERSONAL ATTENTION TO ALL ENQUIRIES.
AVAIL YOURSELVES OF OUR PURCHASING ORGANISATION.

THE SMALL TOOLS SUPPLY CO., LTD.

AVENUE CHAMBERS, SOUTHAMPTON ROW, LONDON, W.C.

Telegrams: "Prosalt," West-Cent., London. 'Phone: 2655 Museum.

CHAMBERLIN.—Sec. Lt. J. B. Chamberlin, R.A.F., who was accidentally killed on April 23rd, was the second son of H. W. Chamberlin, of Restronguet, Penryn, Cornwall. He was 19 years of age.

EXLEY and BEADLE.—Sec. Lt. Exley, R.A.F., and Serjt. Beadle, R.A.F., were drowned while flying off the South Coast near Hythe on April 23rd.

FRASER.—A verdict of "Accidental death" was returned at Ruislip on April 25th, on Donald Fraser, 21, an American soldier, who was killed by a blow from an aeroplane propeller.

HOWELL, ROBINSON, and CLAYTON.—Verdicts of accidentally killed were returned at inquests in a Yorkshire town on April 23rd on the bodies of Lt. Evan J. Howell, R.A.F., of Pontypridd; Lt. Harry E. Robinson, R.A.F., of West Ealing; and Sec. Lt. A. Clayton, R.A.F., of Horsley, Shropshire, who were killed on April 21st by a collision in mid-air between two aeroplanes, as reported last week. An officer said that whilst the machines were at a height of over 2,000 ft above a country village, one solely in charge of Mr. Howell and the other carrying Mr. Robinson and Mr. Clayton, they struck each other nose to nose, and crashed to the ground. All three officers were dead when picked up. A farm lad said that he saw the machines meet and the wings strike together. The side wings dropped off and the machines crashed into a meadow.

OWEN-HOLDSWORTH.—Sec. Lt. James Philip Owen-Holdsworth, R.A.F., who was killed in action on April 12th, was the eldest son of Mr. and Mrs. Owen-Holdsworth, of Jewell House, Marden, Kent. He was 19 years of age.

THOMPSON.—Lt. Eric Barton, R.A.F., who was killed abroad as the result of an aeroplane accident on April 8th, was the eldest son of H. C. Thompson, of Buenos Aires.

WHELAN and LEVEY.—Lt. Cyril Whelan, R.A.F., son of Mr. Albert Whelan, was killed in an aeroplane collision, which occurred at a south-eastern aerodrome on April 26th. Lt. Levey, R.A.F., who was killed in the same accident, was a cousin of Mr. Whelan, and a son of Mr. Bert Levey.

WINTON.—Sec. Lt. Harold Barkley, R.A.F., who was killed on April 21st as the result of an aeroplane accident, was the only son of William and Edith Winton, Beddington, Surrey. He was 24 years of age.

Engagements.

ASSINDER—SINCLAIR.—An engagement is announced between Lt. Francis Richard Assinder, R.A.F., son of Mr. Thoma

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"*Flight, Gosport.*"
"*Flying, Southampton.*"

GOSPORT AIRCRAFT CO.

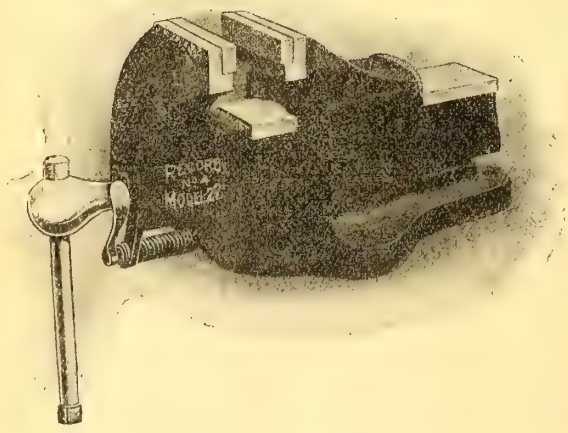
HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street Hanover Square, W.1.

BENCH VICES



PROMPT DELIVERIES.

C. & J. HAMPTON, LTD.,
SHEFFIELD.

TELEGRAMS: "VICES, SHEFFIELD."

VENUS PENCILS

FOR sketching, topographic maps, mechanical drafting, and all technical uses, military, naval and civil, there is one pencil which is famous as being the standard by which all pencils are judged. This is the VENUS. VENUS pencils are perfect for every purpose. More VENUS' are sold than any other drawing pencil. Quality counts!



Specify VENUS and look for the distinctive VENUS finish.



17 Black degrees from 6 B (softest) to 9 H (hardest), and hard and medium copying.

FREE!
This Trial Box with Five VENUS Drawing Pencils and Venus Eraser sent free!

Please enclose 3d. in stamps to cover postage and packing.

WRITE FOR IT!



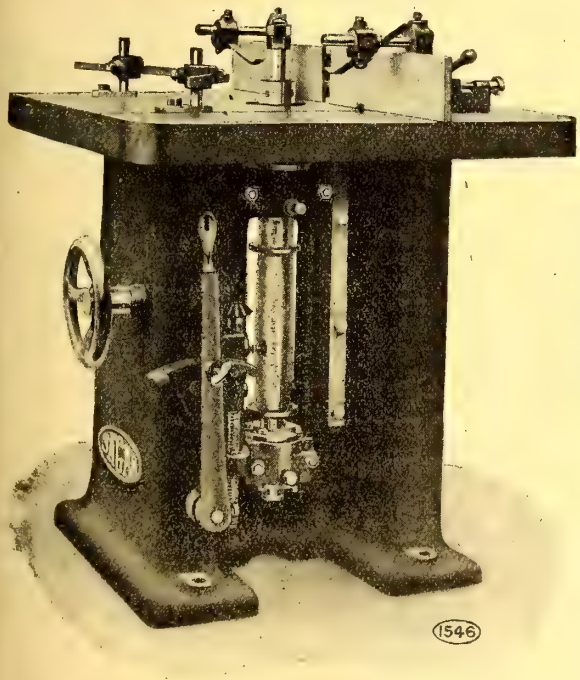
American Lead Pencil Co.
173/5, LOWER CLAPTON ROAD, E.5

Heating & Ventilation
for
Aeroplane Factories
Munition Shops
Dope Rooms
etc.

ROSSER & RUSSELL LTD
HEATING ENGINEERS
Manchester House, 37 Duke St, Oxford St, W1.
Telephone Mayfair 5210. Telegrams "Lesorus Hamm, London

Work in hand
at the present time for
Messrs. Handley Page Ltd
National Aero Engine Co
Gnome & Le Rhone Engine Co
and many others

May we quote you for your requirements



SAGAR

THIS ILLUSTRATION shows
OUR LATEST TYPE

Heavy Single Spindle Moulding and Shaping Machine

Spindle is exactly central with main Frame in all directions, and revolves in ROLLER BEARINGS.

Several other new features

Fuller Particulars on request.

We make a complete line of Woodworking Tools for Motor Body Builders, Aircraft Constructors, etc., and shall be pleased to send full particulars of our manufactures to any one interested.

J. Sagar & Co., Ltd., Saw Mill Engineers, Canal Works, **Halifax,** Eng.
LONDON OFFICE: 60, WATLING STREET, E.C.

Assinder, of Handsworth, Birmingham, and Miss Eleanor Crowle St. Clair Sinclair, daughter of the late William Sinclair, of Hull, Yorks.

* * *

MARRIAGES.

GLANVILLE—SAVORY.—On April 20th, in London, Hugh Fanshawe, Capt., Royal Air Force, younger son of the Revd. O. F. Glanville, of South Brent, Devon, was married to Beatrice Gertrude, widow of Lionel C. H. Savory, of Dibden, Southampton, by licence.

GRANT—ST. JOHN.—Capt. Grant, R.A.F., formerly Lt. Tryggve Gran, of the Norwegian Navy, who in 1914 flew from Cruden Bay, Aberdeenshire, to Norway, was married on April 29th, at the Strand Registry Office to Miss Lily St. John (Lilian Clara Johnson).

STAMMERS—SPENCER.—The marriage between Maj. H. V. Stammers, R.A.F., second son of Mr. and Mrs. S. J. R. Stammers, Beaconsfield, Gunnersbury, and Alice Margaret, only daughter of the late J. E. H. Spencer, and of Mrs. Spencer, of 18, Montague Road, Richmond, took place on May 1st, at St. Matthias's Church, Richmond Hill.

FOREIGN COMMUNIQUES.

FRANCE.

APRIL 24th.—The bad weather hampered aerial activity.

The air raid alarm last night was occasioned by an enemy aeroplane, which was picked up by the searchlights and attacked with violent gun-fire. It was forced to descend near Nogent l'Artaud, in the neighbourhood of Meaux. It proved to be a bombing triplane, and the occupants, a lieutenant, a non-commissioned officer, and a machine-gunner, were made prisoners.

APRIL 26th.—During the 22nd and 23rd of April seven German aeroplanes and a captive balloon were brought down by our pilots. Ten other machines fell in their lines severely damaged as the result of combats.

It is confirmed that two enemy aeroplanes reported as driven down out of control on the 20th were really brought down. Five other German machines and a captive balloon were also destroyed on the 21st, in addition to those already indicated in the communiqué of that date.

On April 23rd and during the night of April 23rd-24th 5,000 kilogrammes (5 tons) of projectiles were dropped by our bombers on the stations of Nesle, Roye, and Chaulnes.

"ULSTER" FANS

FOR ALL PURPOSES.

Forced and Induced Draft on Boilers. Fumes Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. Hot-Water. Steam. "Ulster" Stoves.

WE GUARANTEE SUCCESS. Our 50 years' experience is at your disposal.

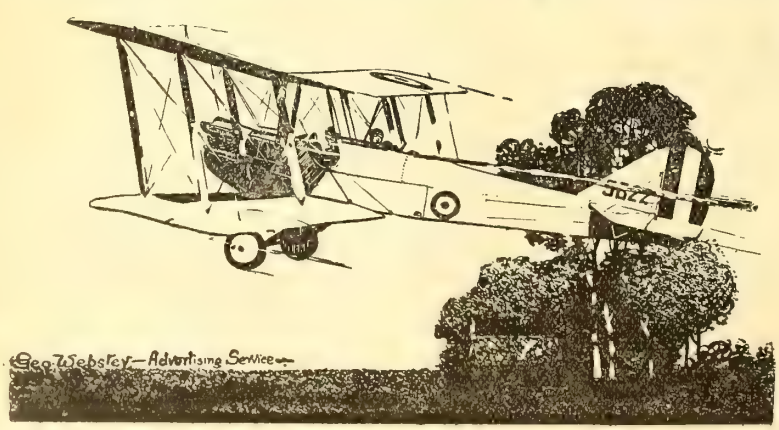
MUSGRAVE & CO., LTD.,
Manufacturing Engineers,
BELFAST, LONDON, MANCHESTER, CARDIFF.

TO ENSURE ECONOMY AND EFFICIENCY
SPECIFY
VICTOR BLADES FLEXIBLE BACK



EVERY BLADE COUNTS.

VICTOR SAW WORKS
(CANADA) LIMITED,
283, WEST STREET, FINSBURY CIRCUS, E.C. 2.



METAL COMPONENTS
FOR
AIRCRAFT.

Undercarriages
Tail Units
Tubular Framework.

THOMPSON BROS. (Bilston) Ltd.
AERO. DEPT., Bilston, Staffs.

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY.: 2 pints of glue.
LOADING: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.

Where Flying Men are fitted out.

ONE SERVICE



Uniformity of custom and kit; on land, on sea and in the air one organisation only—unity of control centring on one ideal—efficiency. That is the ideal aimed at by the R.A.F. It also summarises the policy of Dunhills; as the R.A.F. have co-ordinated all the efforts and abilities of its two parent services for the better 'strafing' of the Hun so is every idea, every thought and every effort concentrated by the House of Dunhill on the problem of eliminating weather.

The land crab knows nothing of weather inconvenience—it is left to men of the R.A.F., who fight it in its own headquarters, to feel the full fury of its All Highest displeasure.

But Dunhills know and have provided for the worst to the last little detail; and it is just this expert "understanding" knowledge that made them so indispensable to men of the old Air Forces.

The new Force still has the old traditions, the old enemies and now they are one service they still have Dunhills for equipment—the one service that will never fail them.

Call in, if you can, at our well-known "base" in Conduit Street—a few paces from Regent Street—and inspect the full kit. Or, if London is "out of bounds," drop a line for patterns and full details which will be sent gladly on request.

Dunhill's

LIMITED.
2, Conduit Street,
Regent Street, London, W. 1.

W. G. TARRANT.

CONTRACTOR TO THE AIR BOARD.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

HEATING AND VENTILATIOI

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

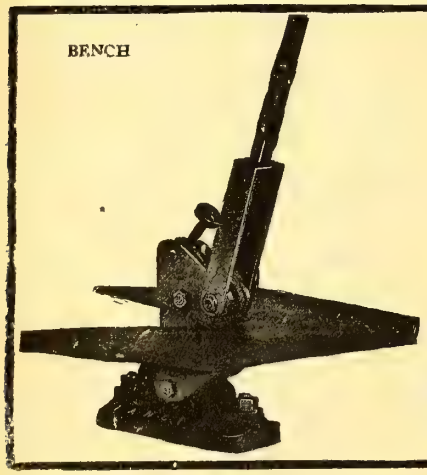
Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. **Wire: "KINNELL-BOROH-LONDON."**

CHAS. P. KINNELL & Co., Ltd., SOUTHWARK ST., LONDON, S.E.

BENCH



TANGENT
SHEET METAL SHEARING
APPLIANCES
PATENT

Self - Feeding. Fast - Cutting.

Blocks illustrate a combined portable and bench tool for sheets up to 3/32" steel, and 1/8" softer metals.
Other types also made, including portable hand tools for Corrugated Iron.

WRITE FOR DESCRIPTIVE PAMPHLET
MONTGOMERY, SMITH & CO. LTD.
Patentees and Manufacturers,
TANGENT WORKS, KEYNSHAM, SOMERSET.



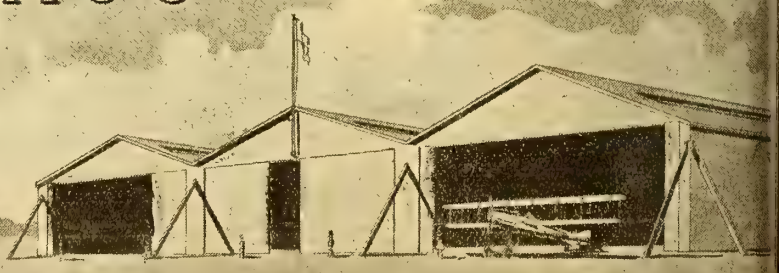
PORTABLE

T. W. PALMER & Co.

ESTIMATES FREE

MERTON ABBEY IRONWORKS
LONDON · S.W. 19.

DESIGNERS . MANUFACTURERS AND ERECTORS OF EVERY DESCRIPTION OF AIRCRAFT BUILDINGS TEMPORARY OR PERMANENT



WORK · CARRIED · OUT · TO · OUR · OWN · OR · CUSTOMERS · DESIGNS

NOW READY.

SIXTH AND REVISED EDITION.

Price 7/6 net.
8/- Post Free.

THE AEROPLANE SPEAKS.

By

CAPTAIN H. BARBER, A.F.Ae.S.

With 40 Full Plates of "Types of Aeroplanes."

"A surprisingly useful book."—*Westminster Gazette.*

*** Six Editions of "The Aeroplane Speaks" have been called for in 15 months. The demand for the book grows month by month and the latest edition is by far the largest.

SONGS OF THE SUBMARINE

By Klaxon. 2/- net, 2/3 post free.

BALLADS OF THE FLYING CORPS

By G. R. Samways, R.F.C. 2/6 net, 2/9 post free.

These two volumes of verse are unique, because both are the outcome of actual experience. Both are in demand.

Order of your bookseller or direct from—

McBRIDE, NAST & Co., 2, Breams Buildings, E.C.

Now Ready. **5s. net, 5s. 4d. post free.**

Fully Illustrated with Diagrams.

HOW AN AEROPLANE IS BUILT.

By STEPNEY BLAKENEY.

With an Introduction by C. G. Grey.

*** This book contains the articles which appeared in the "Aeroplane" under the title "Construction of Aeroplanes and their Components." They have been thoroughly revised, and are reprinted in response to many requests.

Now Ready. **1s. 6d. net, 1s. 8d. post free.**

THE "AEROPLANE" BLUE BOOK.

A DIRECTORY OF AIRCRAFT FINANCE, 1918.

By G.A., Financial Editor of the "Aeroplane."

A handy, up-to-date and authoritative reference book on all matters affecting the Directorate, Capital, Accounts, etc., of Aircraft and Kindred Companies.

The "Aeroplane" & General Publishing Co., Ltd., 2, Breams Buildings, E.C.



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd

The Linen Hall, Regent Street, London, W.

THE

Eastbourne Aviation Co. LTD.

ESTABLISHED 1911

AEROPLANE CONSTRUCTORS

Contractors to the Admiralty

TELE{GRAMS: Aircraft / PHONE: 1176} EASTBOURNE

Our aeroplanes further carried out numerous attacks with machine-guns on gatherings of enemy troops.

April 26th.—Army of the Orient.—Two enemy aeroplanes have been brought down.

April 29th.—Two German aeroplanes were brought down by our pilots during April 27th.

On the same day our bombarding machines dropped six tons of bombs on establishments in the enemy zone.

GERMANY.

April 23rd.—During the last two days 30 enemy aeroplanes were brought down. Lt. Buckler achieved his 32nd victory and Lt. Monckhoff his 25th.

April 24th.—Rittmeister Baron von Richthofen has not returned from his pursuit of an enemy across the Somme battlefield. According to an English report he has fallen.

ITALY.

April 24th.—British aviators shot down two enemy aeroplanes over Levoco, and two more near Mt. Lisser. A fifth was hit by our own aviators and fell in the vicinity of Vidor.

April 24th.—During the day of April 22nd, in spite of unfavourable weather conditions, our hydro-aeroplanes were active in the Upper Adriatic. Reconnoitring machines having observed in the neighbourhood of Pola and Rovigni movements of enemy torpedo craft and small cargo-ships, one of our bombing squadrons made an attack during the morning and succeeded in getting two direct hits on a torpedo boat.

In the afternoon a surprise attack was made on a warship in the Fasana Canal, which was protected by torpedo boats and hydro-aeroplanes. One hydro-aeroplane was brought down by our machines and fell into the sea in pieces. The warship and the torpedo craft were heavily bombed. One of our machines was damaged and forced to land in the sea very near the enemy coast, but the other machines, in spite of the heavy sea, succeeded in descending and saving the pilot.

April 26th.—In air combats over Conegliano (about 10 miles east of the Piave) our aviators brought down two enemies.

TURKEY.

April 23rd.—On the Palestine front, one of our aeroplanes brought down in aerial combat an enemy behind our lines.

April 27th.—One enemy aeroplane was brought down in the neighbourhood of Nablus. The observer was killed. The pilot was wounded and taken prisoner.

BELGIUM.

April 27th.—In the course of a fight three of our aviators attacked four German aeroplanes forming part of a squadron of more than 20, and brought down one, in flames in our lines.

FOR AIRCRAFT WORK.

Small Tools from Stock.

PERSONAL ATTENTION.

Let us assist you by sending us your requirements.

The HIGH SPEED TOOL Manufacturing Co., Ltd.,

SHAFTESBURY ROAD, BOLLO BRIDGE ROAD, ACTON, W.3.

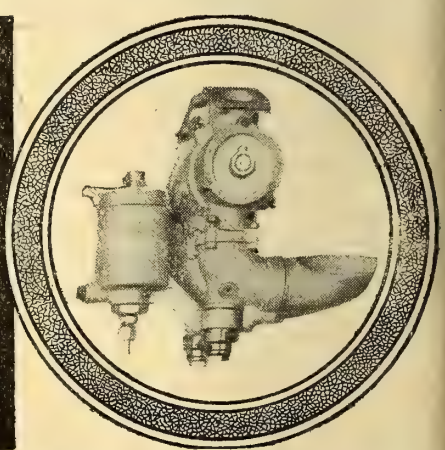
'Phone: CHISWICK 655. Telegrams: HYSPECUT, PHONE, LONDON.

Claudel-Hobson

CARBURETTERS

H. M. HOBSON, LIMITED

29, Vauxhall Bridge Road, London, S.W.1



THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

PLYWOOD

IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.

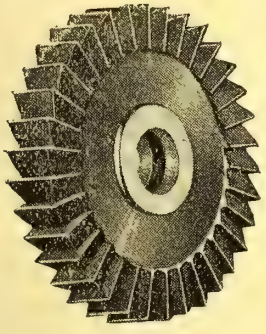
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

TWIST DRILLS



MILLING CUTTERS

QUICK DELIVERIES.



CENTRE DRILLS.

SEND US



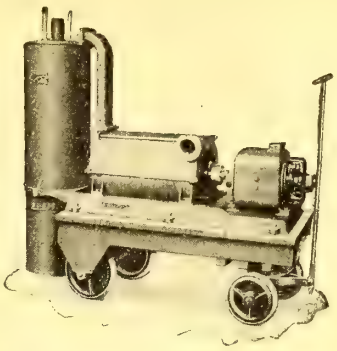
YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,

32, Queen Victoria St., London, E.C.4.

'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.



For cleaning Fuselages

Workshops, stores, blowing dust out of motors, etc, the Sturtevant (factory type) Portable Turbine Cleaner and Blower offers many advantages over ordinary methods of cleaning—speedily takes up dust and refuse.

Send us your Enquiries, we shall be pleased to assist you. Pamphlet W1208 sent on request.

Sturtevant

Engineering Co., Ltd.,

147, Queen Victoria St., London, E.C.4.

TERRY'S

THE SPRING AND PRESSWORK SPECIALISTS

REMEMBER that combination when you are Spring buying. It is valuable because it ensures precisional accuracy and high grade Service.

— that combination is honoured wherever Springs are used, and—we are so jealous of it that we only use the best for every job we tackle.

May we quote for your War Work orders? Write us.

HERBERT TERRY & SONS, Ltd.
The Spring & Presswork Specialists,
REDDITCH. England.



Telephone No. 61, Redditch (4 lines.)

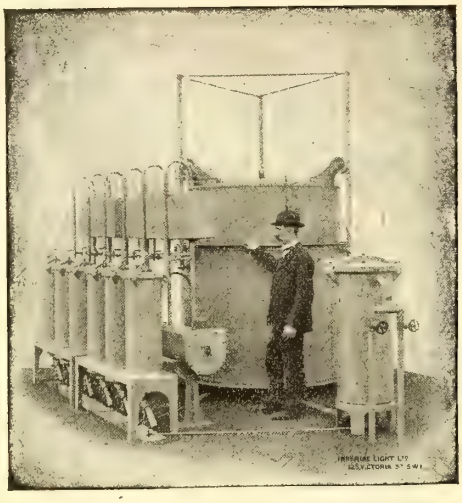
Light Steel Stampings for Aeroplanes

Any size or weight: Rough or machined: Single Piece or Combination pressed & welded by Oxyacetylene & other processes

Joseph Sankey & Sons Ltd.

Hadley Castle Works

Wellington Shropshire



Class 5 Imperial Acetylene Welding Plant.

OXY-ACETYLENE PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

Telegrams—"Edibrac, Phone, London."
Telephone—Victoria 3540 (3 Lines)

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.



FIRST IN 1880 FOREMOST EVER SINCE

PROMPT DELIVERY AGAINST "A" CERTIFICATE.

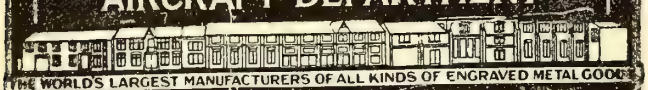
The quicke drying and hardes Ename manufacture

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOOD
Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.
NEW CROSS, LONDON, S.E.

AIRCRAFT DEPARTMENT



THE WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

British Metal (Kingston) Ltd.
The Factory,
Kingston-on-Thames.

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, De H.
RESIDENT A.I.D. EXAMINER.

Bowden Wire Ltd.

TRADE MARK

LONDON

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

Established 1897.

VICTORIA ROAD
WILLESDEN JUNCTION NW10

Of special interest to Government Contractors.

J·B·BROOKS & Co Ltd

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments, and Cases of

LEATHER

J.B. Brooks & Co Ltd
104 Criterion Works
Birmingham.

1191

Bowden,

Controls,
AND
Cables
FOR
Aeroplanes

Suitable for all possible purposes.
Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD.,
TYSELEY, BIRMINGHAM.

BOWDEN TYSELEY BOWDEN TYSELEY

R.M.B.

LECTRIC CABLES



No. 111A
SPECIAL MAGNETO CABLE
AIR BOARD SPECIFICATIONS.
FLEXIBLES SPECIALLY MADE FOR AERO ENGINES
EST 1901

. KALKER & CO.,
COVENTRY.

BUY
Your Streamline Wires
FROM
THE ORIGINAL MAKERS
BRUNTONS
MUSSELBURGH,
SCOTLAND.

We can supply Wires, plain, screwed or fitted with Fork or Universal Joints.

B·G·L

METAL COMPONENTS
FOR
AIRCRAFT

The B.G.L. mark stands for
SOUND WORKMANSHIP.

We have been established as Metalworkers for 21 years, and have had 3½ years' experience in Aero Metal Work.

THE BIRMINGHAM GUILD LTD
AERONAUTICAL ENGINEERS AND METAL WORKERS,
GT. CHARLES STREET, BIRMINGHAM.

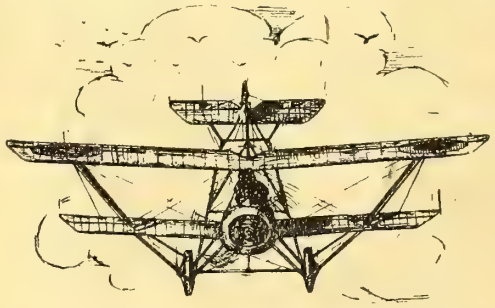
AEROPLANE

RUBERY, OWEN & Co
TELEPHONE No 87. DARLASTON
TELEGRAMS ROOFS. DARLASTON
DARLASTON. SOUTH STAFFS
TRADE MARK

ACCESSORIES

7 Years' Experience.

Wires:— "Carbon," Cambs.
'Phone:— Cambs. 5.



Special arrangements to assist Enlistment of PILOTS in the

NEW AIR FORCE

Write for particulars before vacancies are filled to—

The CAMBRIDGE SCHOOL OF FLYING
and AERODROME CO., Ltd.,
30b, St Andrew's Street, Cambridge.

A REMINDER. in Aero-Engineering; for Manufacturers.

The School also conducts:—
(1) **Correspondence Course**
(2) **Drawing Office Service**

Contractors to H.M. Government.

SWIFT
AVIATION CO.

Engine Plates in Stock, Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE— 762 KINGSTON
'GRAMS— "SWIFT, KINGSTON"

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
47, VICTORIA ST., S.W.

Works:
HIGH ST., MERTON, and HENDON

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

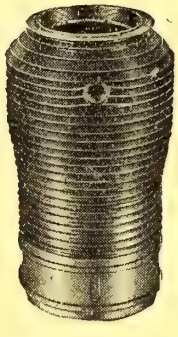
W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.



THE
Beverley Engineering Works

Aeroplane Cylinders
Clerget Le Rhône Gnôme



WILLOW AVENUE, BARNES, LONDON. 'Phone: Putney 473

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.

School Approved by R. Ae. Club.

PUPILS COACHED FOR THE AIR SERVICES.

Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

HIGH-CLASS

ALUMINIUM CASTINGS

FOR ALL TRADES.

We Specialise in Aluminium Cylinders and General Aero and Motor Engine Castings,

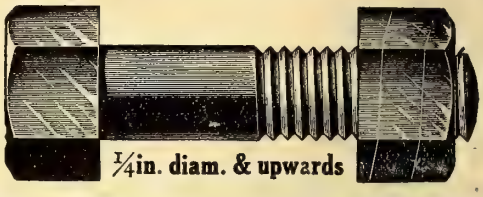
CAST IRON CYLINDERS

Water and Air-cooled for Aero & Motor Engi es

ALL THE ABOVE CASTINGS
TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,
Atlas Works :: Grove Street,
BIRMINGHAM.
ALUMINIUM AND IRON FOUNDERS.

BRIGHT BOLTS & NUTS



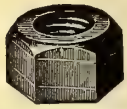
¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ¼in. to 2½in.)  (sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

TIMBER

SILVER SPRUCE
ENGLISH ASH
WALNUT & MAHOGANY

JOSEPH OWEN & SONS
Limited
Borough Saw Mills,
LONDON, S.E.1.

Telephone: Hop 3811. Telegrams: "Bucheron Sedist."

'Phone 3373 Museum.

Aircraft

National Aircraft Mfg. Co., Ltd.,
15, Drummond Crescent,
Seymour St., Euston Rd., London, N.W.1

THE MIDLAND MOTOR CYLINDER Co. LTD.

SMETHWICK NR. BIRMINGHAM

TELEPHONE—289 SMETHWICK TELEGRAMS - RAFWORK, SMETHWICK

SPECIALISING IN

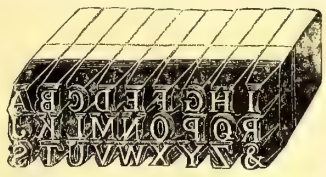
AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

CONTRACTORS TO WAR OFFICE, ADMIRALTY AND AIR BOARD.

Phone—East 3331 (2 lines). Wires—Dayhur, Phone London.



STEEL  STAMPS

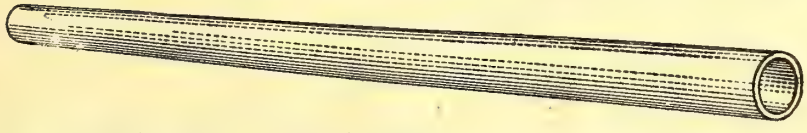


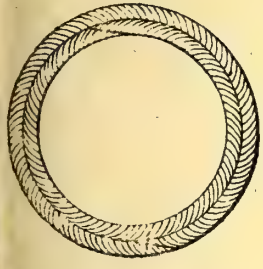
And MARKING ROLLERS for all descriptions of Aircraft Parts

BRANDING IRONS. Inks and
STENCIL PLATES. Brushes.

JOHN MEERLOO & SONS,

CLEVELAND WORKS, CLEVELAND STREET, MILE END, LONDON, E. 1.





Patent No. 4704/15.

McGRUER SPARS

are THE ACME of

STRENGTH and LIGHTNESS

Particulars from :—

McGRUER BENTWOOD HOLLOW SPAR Co.,
Commercial Wharf, Lambeth, LONDON, S.E.1.

"NOVELLON" DOPE

AND AEROPLANE VARNISH.

CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED.

Telegrams: *Cellutate, London.*

8, WATERLOO PLACE, S.W.1. *Phone: Regent 4045.*

Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2580.)

THE POOLE AVIATION CO.
POOLE, DORSET.

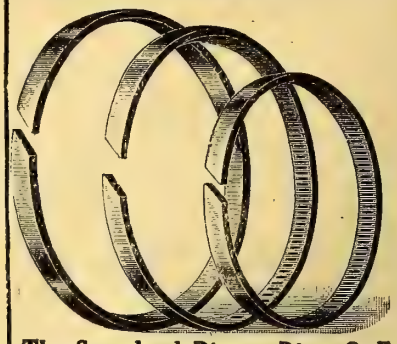
Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

Cast-Iron Hammered Piston Rings



(By the Davy-Robertson-Process)

In our Special Piston Ring Iron. All sizes up to 72 in.

Quick Delivery

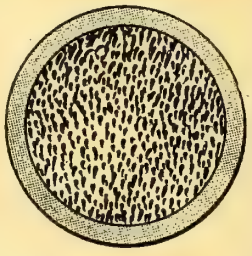
Absolutely Reliable.

Low Prices

Telephone No. 2149.
Telegrams—
"Ocean" Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Premier Works, Don Road Sheffield.

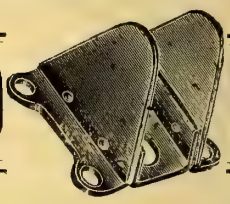
ANTOL CASE HARD



Harden your Screws and Gauges with **ANTO L.**
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1

Toolmaking, Diesinking Stamping, Presswork.

AERO  PART

WILLIAM MILLER
13½, Gt. Hampton St.,
BIRMINGHAM.

HOPTON & SONS
(HOPTONS)

GEORGE STREET, EUSTON SQUARE, LONDON. N.W. 1 & UNION WORKS, MARKET HARBORO', LEICESTERSHIRE.—

PIONEER TIMBER MERCHANTS AND BENT TIMBER MANUFACTURERS OF

AEROPLANE PARTS

Telephons—
Museum 496.
Mkt. Harboro' 13.

ESTABLISHED
1840.

Telegrams—
Hoptons, Eusquare, London.
Hoptons, Mkt. Harboro.

STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK

J. B. GUTHRIE & SON
(JOHN J. GUTHRIE)
30, ST. MARY AXE, LONDON
TELEGRAMS—BUSIRIS LED, LONDON. E.C.
TELEPHONE—AVENUE 1432.

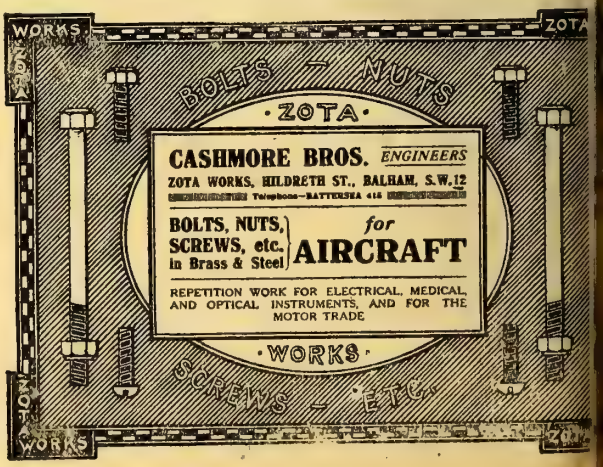
THAMES BANK (BLACKFRIARS) IRON Co., Ltd.
THE
Upper Ground St.
LONDON, S.E.

SPECIALISTS IN

HEATING AND VENTILATING
Factories, Hangars and Doping Shops.

TELEPHONE: HOP 763.

TELEGRAMS: "HOT-WATER FRIARS, LONDON."



EYE BOLTS.



The CARLETON MFG. Co., Ltd.
Brighton Square,
573b, Moseley Road, Birmingham.

Y.E.S. Telegrams: Y.E.S., LEEDS.

Y.E.S. Telephone: 8927 CENTRAL.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'EATONIA' Process.)

Y.E.S. 'AERO' BRONZE
(Under A.I.D. Inspection.)

PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3′ 6″ long.

THE MOST DURABLE YET PRODUCED.

SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, LTD.,
WORTLEY, LEEDS.

Y.E.S. Y.E.S.

The Best Piston Rings



...ntifically designed. Made from ... tensile cast iron and hammered ... on even radial distribution ... pressure. Gastight. Sizes up to 30 in. diam.

...ie BRITISH CHUCK & PISTON RING CO. LTD.
...olbrook Lane, COVENTRY.

The Air Navigation Co., Ltd.

BLERIOT & SPAD AIRCRAFT WORKS,
ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.
NORBERT CHEREAU, Managing Director.
Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

HIDE GLUES
FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.
Telephone: 4978 Avenue

Lang Propeller LTD.

Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.

'FEARLESS' ENGINE CLEANING BRUSHES

As used by the R.F.C.



Send Trade Card for FREE SAMPLE.

FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD. LONDON——N.16.

Auster LTD

for AUSTER-TRIPLEX SHIELDS
AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

BIRMINGHAM:
Crown Works, Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Phone: Putney 737. Established 1912.
ROPOR'S
Aeroplane and General Sheet Metal Works.
COWLS, TANKS, UNDERSHIELDS, FAIRINGS.
Hammered Work in all Metals.
Experimental and Special Work Undertaken.
347a, New Kings Road, Fulham, London, S.W.6

AEROPLANE STAMPINGS
IN 3 PLYWOOD.
Perfect cutting. Sample posted free.
SMALL PARTS UP TO 12 ins. by 4 ins.
A. W. ROSS, 20, HERTFORD RD., KINGSLAND RD., LONDON, N.1

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Part
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

NAME PLATES.
WE SPECIALISE IN EVERY DESCRIPTION OF NAME PLATES IN METAL, VORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

CASE HARDENING BOXES
IMMEDIATE DELIVERY.
ANY TYPE OR SIZE.
MCKENZIE, 15, NEWTON RD., CRICKLEWOOD, N.W

Springs! Springs! Springs!
We make a speciality of
Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising following machine work: Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding, Sheet Metal Work. Well-equipped Welding and Brazing Dept.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.
Offices & Works: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richm

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

BRAZING AND SILVER SOLDERING.
J. W. KING
36, ST. JOHN'S SQ.
LONDON, E.C.1.
TELEPHONE - - CITY 5238.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD.
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING
RUSSELL BROTHERS, Ltd., REDDITCH
MACHINES.

Trade MENDINE Mark
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.

MISCELLANEOUS ADVERTISEMENTS.

L PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; Id. per word after. TRADE ADVERTISEMENTS, hese columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions, Contracts, etc., 1/6 per line the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1

PATENTS.

ROWLINSON, Chartered Patent (Consulting Engineer, Mr. S. E. .M.Inst.C.E.), 27, Chancery Lane, W.C. Tel. 332 Central.

kerrett, Chartered Patent Agent, 24, Row, Birmingham.—Patents, trade nd designs.

ITUATIONS VACANT.

smen and Assistant Draughtsmen re- n aeroplane work; good mechanical e essential. No one on Government ed apply.—Applications must be made your nearest Employment Exchange, ng this paper and No. 3457.

Mechanics wanted immediately for a v aircraft factory on the South Coast. first class men, thoroughly used to ng, tuning, testing and fitting into 100 h.-p. Mono Gnomes. No one on ent work will be engaged.—Give rticulars of qualifications and salary to your nearest Employment , mentioning this paper and

as Foreman, first class Fitter and experienced in Aircraft Metal Work, ith and Acetylene Welding; good and strict disciplinarian. No one on ent work will be engaged. State erience, and salary required to your Employment Exchange, mentioning r and No. 3506.

s Draughtsman wanted for post near s checker of jig and tool work. Must ienced and reliable. No person al- Government work will be engaged. your nearest Employment Exchange, ng this paper and No. A5096.

Capable Engineer, must be able to rge of a job under works manager's . Practical man essential. No person on Government work or resident more niles away will be engaged.—Palmer's Tooting, S.W.

Turners required for large Midland Men used to aeroplane engine work y apply. No persons already engaged rnment work will be accepted. State erience, and salary required. Appli- must be made through your nearest ent Exchange, mentioning this paper 3536.

sman required for aeroplane factory, district, previous experience of air- rk not essential. No person resident n 10 miles away or already engaged rnment work need apply.—Reply, age, particulars of experience, and quired, to Box No. 3557, THE AERO- 56, Piccadilly, W.1.

at once for work on Handley Page in aircraft factory, London, N.W., a of aeroplane erectors and assemblers; acelle assemblers, and viewers on final There are also vacancies for sheet orkers for petrol tanks and cowling, ith for pipe work, and panel beaters. rict rate and war bonus paid in all No one on Government work or living n 10 miles away will be engaged.— Box No. 3556, THE AEROPLANE, 166, y, W.1.

Buyer wanted for large aeroplane nust have had previous experience and knowledge of markets and materials. n living more than 10 miles away or engaged on Government work need Write, stating full particulars and esired.—Apply, Box No. 3555, THE NE, 166, Piccadilly, W.1.

Mechanical Draughtsman required at once as assistant in aeroplane construction. Good prospects.—Write, Box 805, at Horncastle's, 60, Cheapside, E.C.2.

Inspector wanted for a new aircraft factory on the South Coast. Must be a first-class experienced man; thoroughly used to the assembly and trueing-up of planes and erection of finished machines; also able to inspect detailed workmanship during general progress of work. No one already engaged on Government work need apply.—Give fullest particulars of qualifications and salary required to your nearest Employment Exchange, mentioning this paper and No. 3554.

Charge Hand wanted immediately for a new aircraft factory on the South Coast. Must be a really first-class man to take direct control under the general foreman of the erecting shop, and able to supervise and check work through all details of machine erection; also capable of controlling and leading men. Only first-class applications will be considered. No one already engaged on Government work need apply.—Give fullest particulars of qualifications and salary required to your nearest Employment Exchange, mentioning this paper and No. 3553.

FOREMEN
and PRODUCTION
MANAGERS
REQUIRED

to inaugurate departments at our new works. Good opportunity for men with knowledge of sheet metal working in all its branches. Must have initiative and be used to dealing with Trade Union labour. Preference given to men who have been used to aeroplane sheet metal work or similar occupations. No one residing more than 10 miles away or already engaged on Government work need apply.

Apply—**L. T. DELANEY,** *Managing Director.*
GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.1.

Assistant Works Manager required immediately for aeroplane factory, building complete machines. London district. Thoroughly capable engineer, conversant with modern machine tools for quick production. State age and full particulars of experience and salary required.—White, Box 118, at Horncastle's, 60, Cheapside, E.C.2.

Charge-Hand Fitter wanted in Birmingham district to take charge, about 10 men on plate and tube work. Must be able to cope with increase. State experience and wages required. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3547, THE AEROPLANE, 166, Piccadilly, W.1.

Required at once, Assistant Draughtsman for detail work and quantities, preferably one used to aircraft work. Good wages and conditions. One hour from London. No person already engaged on Government work will be engaged.—Applications should be made through your nearest Employment Exchange, mentioning this paper and No. 3542.

Large number of Aircraft Fitters wanted, with experience of assembling engines into complete machines. Full rate and war bonus. No one living more than 10 miles away or on Government work will be engaged.—Write, Box 348, Sells, Ltd., 168, Fleet Street, E.C.4.

Experienced Man required to take charge of finished wood parts, stores in large aeroplane works in N.W. London. No one engaged on Government work or living more than 10 miles away need write to Box 349, Sells, Ltd., 168, Fleet Street, E.C.4.

Works Superintendent wanted immediately for an aircraft factory on the South Coast. Must be thoroughly experienced in the assembly, erection, and completion of machines, and also able to control men tactfully but very firmly. No one already engaged on Government work need apply.—Apply, in first instance, stating age, experience, and salary required, to your nearest Employment Exchange, mentioning this paper and No. 3552.

AIRCRAFT WORKS, LONDON.
Purchasing Department.

Applications are invited for the post of head of purchasing department in a large aeroplane manufacturing firm. Applicants must have had wide commercial experience in the purchase of engineers' materials and tools, and in sub-contract work. Full details must be sent as to experience and previous positions held. Age and salary required must be stated. All such details will be treated in strict confidence. No one will be engaged who is on Government work or resident more than ten miles away.—Write, Box 3490, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.

Head Cost Clerk desires position, thoroughly experienced in aeroplane and engineering costing, wages, stock records, and general office routine.—Box No. 3524, THE AEROPLANE, 166, Piccadilly, W.1.

Purchaser, with over 17 years' aeronautical and automobile sound commercial experience (British and continental), seeks appointment with enterprising and progressive firm. Extensive knowledge of all markets, building materials, engineers' tools, timber, fabric, etc. Keen organiser. State definitely salary and prospects. Free now.—Box No. 3530, THE W.1.

Mechanical Engineer, over 20 years' experience with internal combustion engines and general engineering work, at present assistant manager small aeroplane factory, wishes improve his position. West Country preferred.—Box No. 3543, THE AEROPLANE, 166, Piccadilly, W.1.

Man, with varied woodworking experience, bench and constructional, also metal-working, wishes to commence at aeroplane erecting (final).—Box No. 3545, THE AEROPLANE, 166, Piccadilly, W.1.

Energetic Man, good at organisation, with combined experience, woodworking and machine shop, seeks position where dual experience is of value; used to male and female labour; has taken charge.—Box No. 3544, THE AEROPLANE, 166, Piccadilly, W.1.

Woodworking Machinist Foreman desires engagement, similar position. Thirty years' practical experience; last five years responsible position on aircraft work. Good organiser and disciplinarian; tactful control male and female labour.—Box No. 3546, THE AEROPLANE, 166, Piccadilly, W.1.

Manager or **Assistant Manager** in aircraft works; thoroughly capable and practical, experienced on H.P. machines. Disengaged May 1st.—Box No. 3550, THE AEROPLANE, 166, Piccadilly, W.1.

Buyer. Advertiser (Grade 3, 24) seeks position as assistant buyer or progress clerk; seven years' experience in buying department of metal and hardware exporters; capable and intelligent. London district preferred.—Box No. 3513, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.—Continued.

Works Manager, free to re-engage immediately. Twenty years motor, five years aero engines and planes: British, American, and Continental experience. Guarantees rapid, up-to-date and economic production. No service obligations.—Reply, Box No. 3551, The Aeroplane, 166, Piccadilly, W.1.

Spindle Hand and all-round machinist seeks situation. First-class experience of aircraft work. Take charge if required.—Box No. 3549, The Aeroplane, 166, Piccadilly, W.1.

Mill Foreman requires situation. Four years' experience in producing wood parts for aircraft. Capable of controlling labour and obtaining best results.—Apply, Box No. 3548, The Aeroplane, 166, Piccadilly, W.1.

Propellers.—Foreman requires similar position, or as Manager. Good organiser, energetic and tactful. Patternmaker by trade. Age 33.—Box No. 3562, The Aeroplane, 166, Piccadilly, W.1.

Spindle Hand requires situation, 20 years' experience, 2½ aeroplanes. Distance no object.—G. Hove, 11, Portland Street, Stepney.

Junior Draughtsman (17), taking a course of lessons, seeks position in aeroplane works.—Box No. 3561, The Aeroplane, 166, Piccadilly, W.1.

Draughtsman, with good mechanical aeronautical experience, is available for the preparation of drawings and tracings.—Box No. 3560, The Aeroplane, 166, Piccadilly, W.1.

ENGINES WANTED AND FOR SALE.

50 h.p. Gnomes for disposal; excellent condition; for immediate use; also spares.—Box No. 3558, The Aeroplane, 166, Piccadilly, W.1.

60 h.p. Le Rhone required, good condition, ready for immediate running.—Box No. 3559, The Aeroplane, 166, Piccadilly, W.1.

AVIATION.

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Engineer in Aeronautics. Demonstrations from complete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTITUTE LTD.,

21a, Loudoun Road, St. John's Wood, N.W.8.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1

Rubber Twill Cuttings, in any quantity. State average size, quantity and price required, to Aylen, 38, Sun Street, London, E.C.2.

A London Firm in South-Western district has facilities for doping and covering, in addition to woodwork of all descriptions, with a large output and guaranteed deliveries. Estimate on application.—For further particulars, apply Box No. 3535, The Aeroplane, 166, Piccadilly, W.1.

Wanted copies of The Aeroplane—whole of Vol. I.; also numbers of Vol. I. for Oct. 19th, 1911; of Vol. II., Feb. 8th, 1912; of Vol. III. for July 11th, 1912; of Vol. IV. for Jan. 23rd, Feb. 6th, and March 27th, 1913, and of Vol. XI. for Sept. 6th, 1916. Any of these numbers will be of service.—Write, stating price, to X. Y. Z., Aeroplane, 2, Bream's Buildings, E.C.

Wanted, The Aeroplane for Jan. 31st, March 14th, May 2nd, and June 27th, 1917. Sixpence each will be paid for any in good, clean condition.—A12, The Aeroplane, 2, Bream's Buildings, E.C.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page IV. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264 or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester.

Cane Seats. Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

FOR SALE.

Tarpaulins.—Waterproof khaki sheets for sale; also few second-hand railway truck tarpaulins; London works.—For prices and particulars write Johnston, 12, Broughton Road,

For Sale, 30 h.p. lorry chassis, in first-class condition; immediate delivery; any class of body fitted to suit customer.—The Royal Garage, 48A, Gillingham Street, Eccleston Square, London, S.W.1.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid.—Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 9 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

To Aeroplane Manufacturers and Others.—Modern manufacturing premises for immediate sale. Floor space, 65,000 sq. ft. Ground, 5 acres, allowing plenty of land for further developments. Within 35 miles London; suitable for aeroplane factory, with railway siding. Complete, with suction gas plants, three 40 h.p. engines, dynamos, and 35 motors for sectional drive. Premises have been built about 10 years, almost wholly on one floor, with North lights. Possession upon completion of purchase. Price, £30,000.—Full particulars of Robert H. Ruddock, Auctioneer and Valuer, 71, Fleet Street, E.C.4.

Brand-new 30 h.p., 6-cyl. Delaunay Belleville chassis. Same model as being supplied to French Government. Streamline bonnet, double carburetter, special springing. A magnificent chassis. Only four delivered, rest taken by French Government. Price, £950.—Apply, Delaunay Belleville Automobiles (England) Ltd., Carlton Vale, Maida Vale, N.W.6.

ENGINEERING.

British School of Aeronautics. Engineering Course; Aero Design; Aeronstruction; Aero Draughtsmanship; Me Engineering. — Pennington's, 254, Road, Manchester.

Your Motor, bought, sold or garaged of your needs attended to in best London at Horace S. Yaker, 16, Street, Piccadilly Circus, W.1.

MISCELLANEOUS.

MAKE MONEY BY WRITI

£50 PRIZE. Send postage (2d.) ticulars and copy of "How to Ear while Learning How to write for Ne and Magazines." Practical and hensive Correspondence Courses—Fic Articles, etc. Expert Literary I Constructive Criticism. Beginners how to make work saleable. Ex testimonials. Address "Editorial" E.M.), 22, Chancery Lane, London,

MODELS.

T. W. K. Clarke and Co., Ltd., M partment, Hampton Wick.—Though full up with full-size aeroplane part we still build models as we did in 19 with Biplanes, etc., in Stock.—Send for our illustrated List, 120 items models; certain metal goods are out

PUBLICATIONS.

BOOKS

By Lieut. Victor W. Page of the U.S. Ai

JUST PUBLISHED.

AVIATION ENGINES. Their Design, tion, Operation, and Repair. A book for t Engineer, and all interested in Aviation, b ised authority. Giving practical instructio and maintenance not to be found Medium 8vo. 580 pages, with over 24 tinctive and specially made Engraving Price

GLOSSARY OF AVIATION TE English-French and French-English. 100 pages, with Plates and Illustratio Pric

AN AVIATION CHART. A large W showing a typical Aeroplane Power Pl Section, with all important components Folding to Pocket Size. Price Ne

London: CROSBY LOCKWOOD 7 Stationers' Hall Court, E.C

Just published. 360 pp. with Illustrations, 6¾ in., limp cloth. Price 6/- net (postage,

The Aviation Pocket Book for

By R. BORLASE MATTHEWS Assoc.M.Inst.C.E., F.Ae.S.

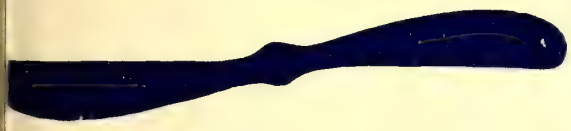
Containing data on Aeroplane Theory and Air Pressure and Resistance, Structural M Engines, Typical Aeroplanes, Piloting, Meteorological Data, Scouting and Signalli etc. With Glossary and other information to all Interested in Aviation.

Prospectus on Application.

London: CROSBY LOCKWOOD & 7, Stationers' Hall Court, E.C.



CHAUVIÈRE'S
Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

HE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
legrams: "Aviprop, Hyde, London." Telephone Kingsbury 104.

OXY-ACETYLENE
WELDING & CUTTING
PLANT

The Latest and Best Type of Plant for this Process as installe by the leading Aircraft, Shipbuilding and Engineering Firms, H. M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C.
ATOZ
G.B.

Carbide. Flarelights. Handlamps.
Petrol and Oil Storage Drums of any capacity. Steel Barrels, Sheet Metal Work for Aircraft, etc.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "Flamma, Vic, London." Telephone: Victoria 4830.

ACCURACY

J. H. ROBERTSON & Co
AERONAUTICAL ENGINEERS

Tel. REGENT 3996 LONDON OFFICE: 1, ALBEMARLE STREET, W. 1

All classes of machining. *FINE LIMIT WORK.*

JIGS, GAUGES, AND SPECIAL TOOLS.
TURNBUCKLES, EYEBOLTS A.G.S. SPECIFICATION.
STAMPINGS, AND HIGH-CLASS STEEL FORGINGS, PRESS WORK, &c.
OVERHAULING AND REPAIRS TO ALL TYPES OF AERO MOTORS.
PROPELLERS FOR ALL TYPES OF AIRCRAFT.

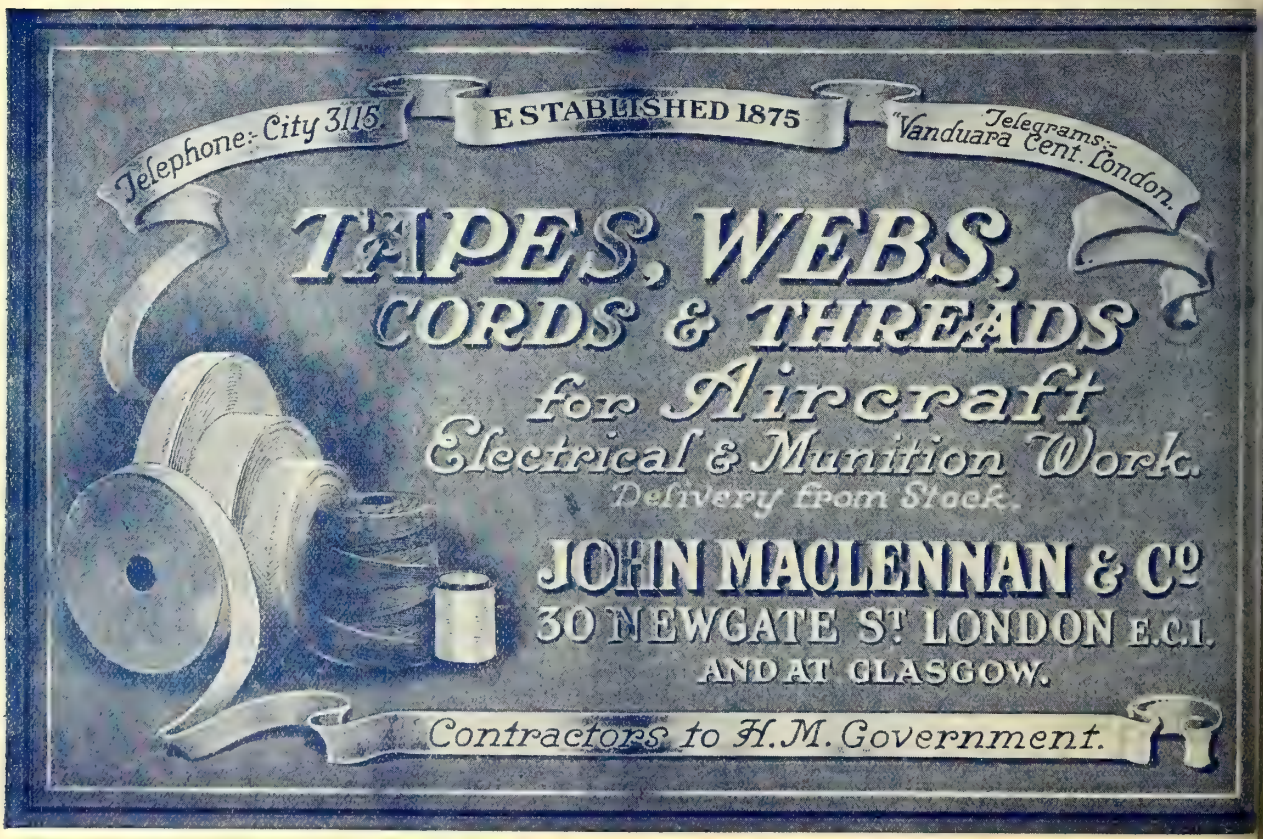
CRANKSHAFTS, PISTONS, GUDGEON PINS, VALVES A SPECIALITY.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams; "Airengine, London" *Telephones: Gerrara 8165; Richmond 1293.*



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W.1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passage, [illegible]; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. Grey

WEDNESDAY, MAY 8, 1918.

Vol. XIV. No. 19. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

THE NORMAN THOMPSON FLIGHT CO. Ltd.

ESTABLISHED 1909

Telegrams—SOARING, BOGNOR
ENTIFLYTE CHARLES, LONDON

Works—MIDDLETON, BOGNOR

CONTRACTORS TO THE ADMIRALTY

Telephones—BOGNOR 48. GERRARD 7385

London Office—
DEWAR HOUSE, 11, HAYMARKET, S.W.1.

DESIGNERS AND MANUFACTURERS OF FLYING BOATS AND LAND PLANES

Auster FOR **Aero-shields**

LONDON. BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE

NON-POISONOUS

DOPE

SEE ADVERT: INSIDE.

TELEPHONE: OLDBURY 111. **ACCLES & POLLOCK, LIMITED.** TELEGRAMS: ACCLES OLDBURY

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.

TRIPLEX SAFETY GLASS

The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aloemarle St., London, W 1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Gothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street Works, BIRMINGHAM.



EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT



AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren, Piccy, London."
" Phone—280 Gerrard

Works

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

CONTRACTORS TO THE
ADMIRALTY & WAR OFFICE

C. G. Spencer & Sons
LIMITED.

THE
KITE BALLOON AND
PARACHUTE EXPERTS

AERONAUTICAL APPARATUS
OF EVERY DESCRIPTION.

ROPES, FABRICS AND EQUIPMENT.

THE PIONEER FIRM.
FIRST IN 1835. FOREMOST TO-DAY.

Works: HIGHBURY, HACKNEY, BRIXTON, CLAPTON
Head Office: 56a HIGHBURY GROVE, LONDON, N.

'PHONE: DALSTON 1893. TELEGRAMS: "AERONAUT, LONDON."

SIDDELEY – DEASY



Contractors to H.M. Air Ministry: Designers & Manufacturers of Aero Engines & Aeroplanes: & of Luxurious Motor Carriages

THE SIDDELEY – DEASY
MOTOR CAR CO., LTD.
COVENTRY



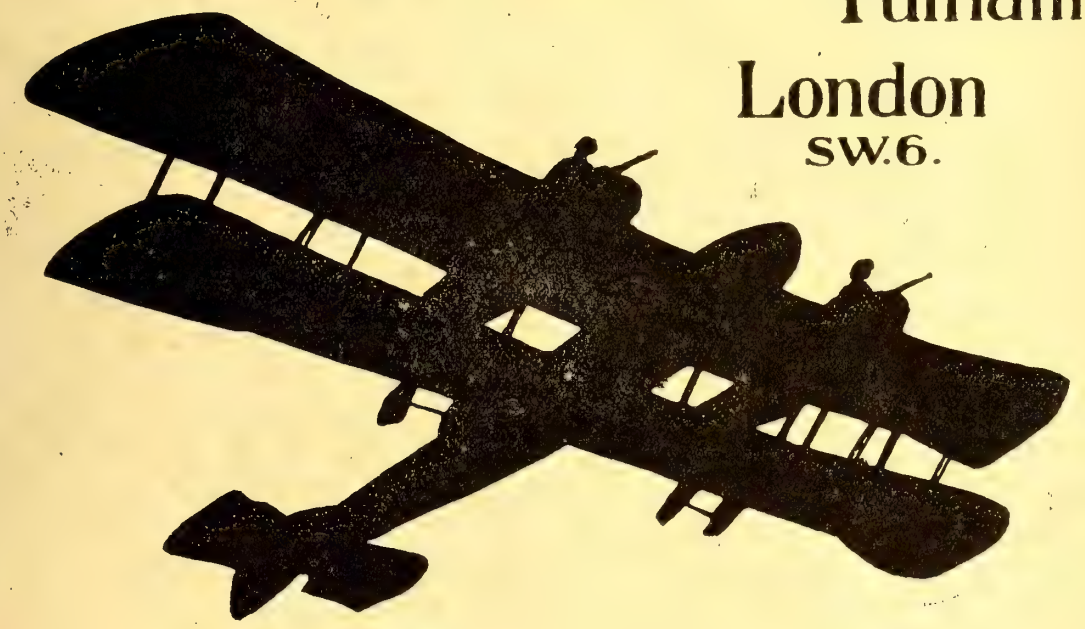
Godbolds


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY

AERONAUTICAL ENGINEERS TO H.M. GOVERNMENT.

THE REGENT CARRIAGE Co. Ltd.

Fulham
London
SW.6.





KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

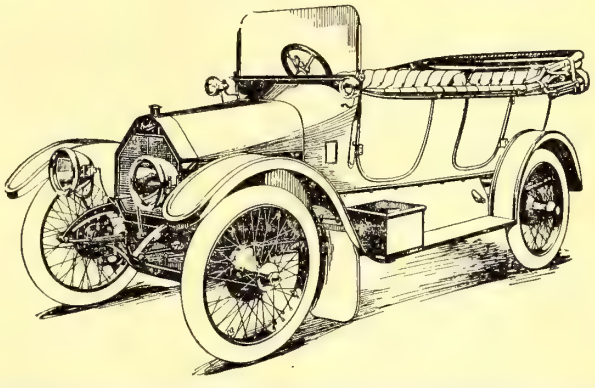
Offices & Works
HENDON, N.W.9.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Humber

Motorists in all parts of the British Empire are ready to endorse the claims of Humber Cars for reliability, durability and refinement of detail. The reason why many others are compelled to wait for new cars is because our whole resources are requisitioned for war work.

Are you on the Waiting List?



HUMBER LIMITED
COVENTRY

THE SUPER-AVIATION CO. LTD.

Aeronautical Designers, Constructors and General Engineers.

Manufacturers of Complete Machines and Spares.

CONTROLLED ESTABLISHMENT under the WAR MUNITION ACT.

HEAD OFFICE and WORKS:—

Dollis Hill Works, Duddenhill Lane, Willesden, N.W.10.

Telephone—WILLESDEN 642.
Telegrams—"SUPAVICOL," LONDON.

Managing Director—N. LEWIN, A.C. Mech. E.

WE CAN DELIVER—

A·G·S· Shackles

SIZES (158) A, B & C.

In any Quantities

AT ONCE.

THE ACTUAL MANUFACTURERS

THE BRITISH GOLD SHELL RING CO., LTD.,

HOUNSLOW, MIDDLESEX.

Telephone; HOUNSLOW 254.

Telegrams, GOLSHEL - HOUNSLOW.

WARING & GILLOW LTD

Furnishers & Decorators to H.M. the King

CONTRACTORS

TO THE

WAR OFFICE AND ADMIRALTY.

LIVERPOOL HAMMERSMITH LANCASTER

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

HEAD OFFICE

OXFORD ST. W.1

TELEPHONE No.: HAMMERSMITH 1980

TELEGRAMS: "Warings Factories, Hammersmith."

ARNOTT-&-HARRISON LTD



Telephone—
WILLESDEN 2297 (2 lines).

Telegrams—
ARNOTHARRI, LONDON.

SPECIALISTS IN ALL
DE HAVILLAND
METAL FITTINGS
UNSURPASSED FOR
PROMPT DELIVERY.

Hythe Rd., WILLESDEN JUNCTION,
N.W.10.

"A & H" SMALL PARTS TO THE RESCUE.



VARNISHES . . .
for AEROPLANES

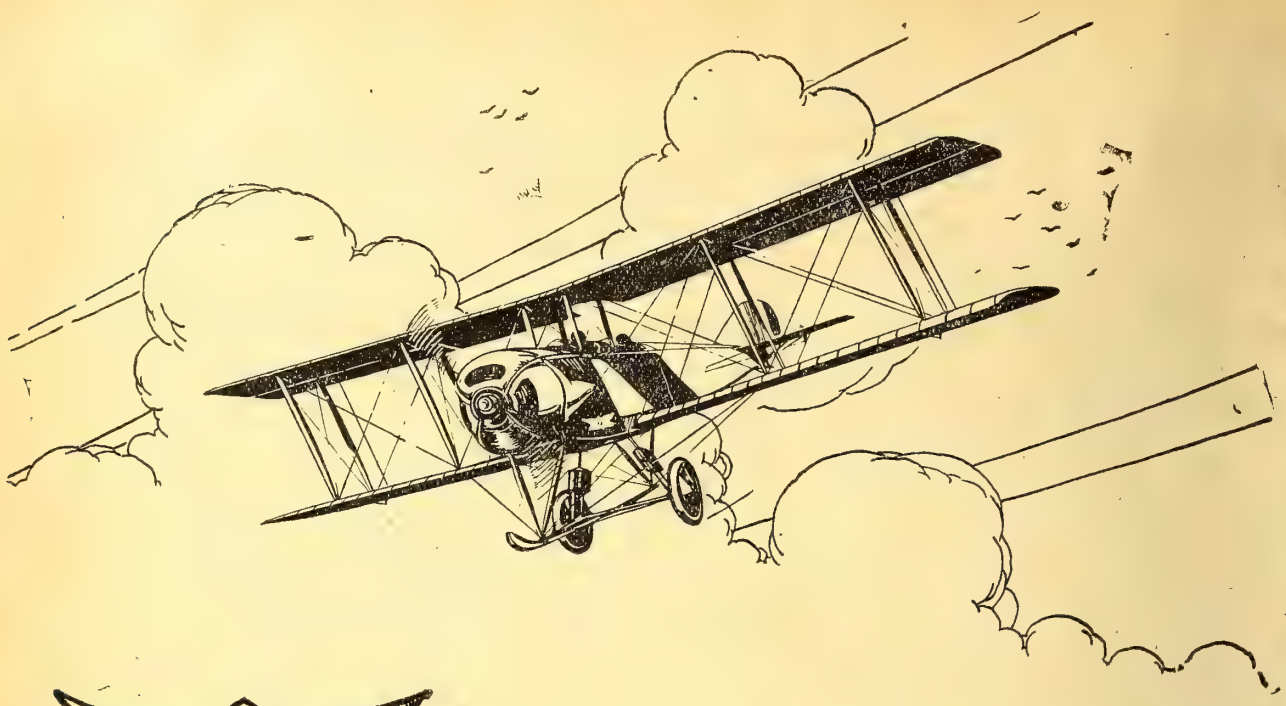
(SUBJECT TO A.I.D. INSPECTION)

AIRSCREWS, SPARS, STRUTS, STAYS, ETC.

ROBT. INGHAM CLARK & CO. LTD.

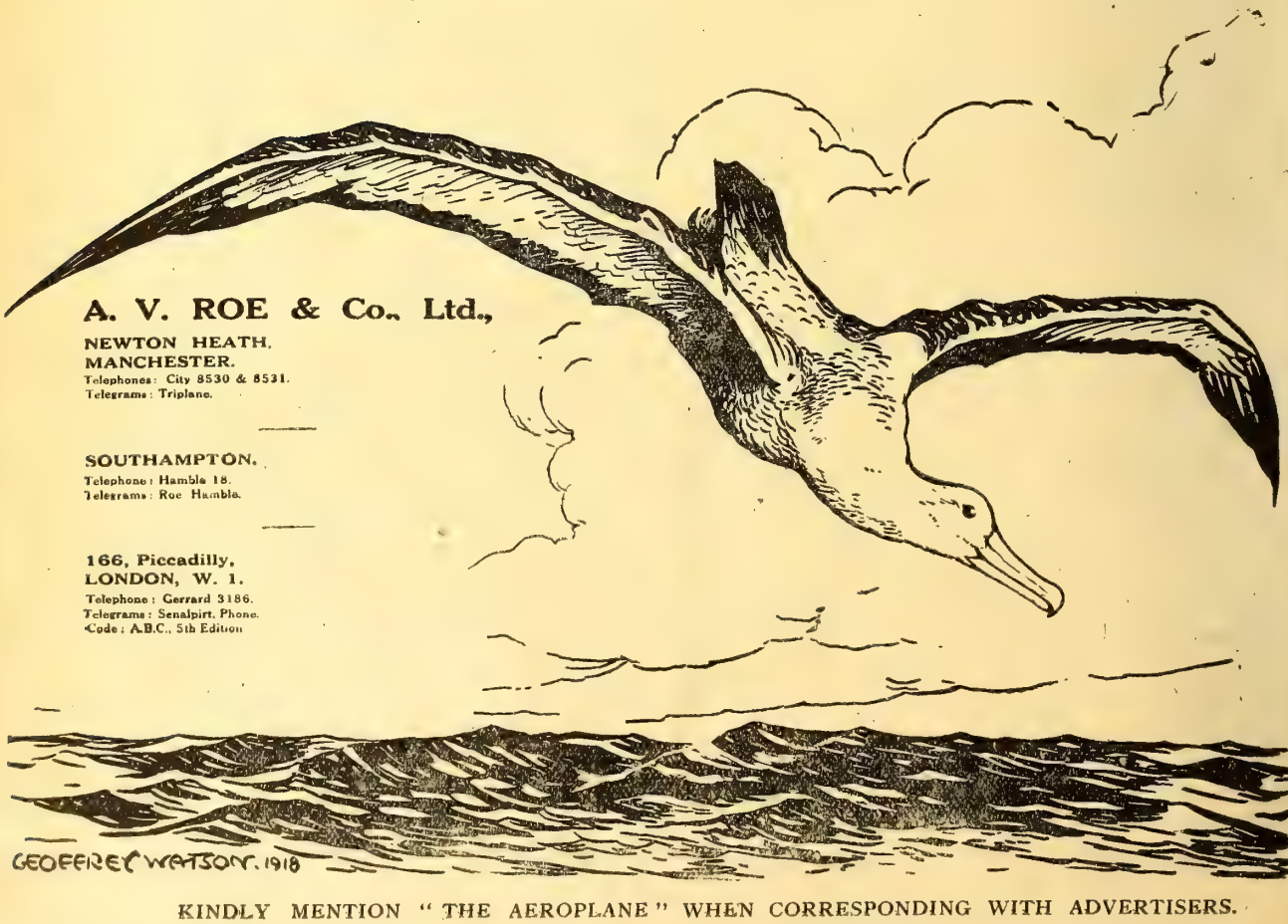
Offices: Walter House, Bedford St., Strand, W.C.2,
Telegrams—Pearline, Westrand, London. Telephone—Regent 3923.

Works: West Ham Abbey, London, E.15
Telephone—East 955, 956.



AVRO

AEROPLANES
AND
PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Senalpirt, Phone.
Code: A.B.C., 5th Edition

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London, W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON THE TASK OF THE NEW AIR MINISTER.

Our new Air Minister, Sir William Weir, starts his arduous task with certain great advantages over nearly all Cabinet Ministers who have ever taken office. In the first place all who are concerned for the winning of the war and for the welfare of the Flying Services wish him well. In no direction has there been any criticism of his appointment. He has never been a politician, so there has been no political opposition. And he has already done so much to increase the output of aircraft, as a member of the old Air Board and as Director-General of Aircraft Production under the new Air Ministry, that he has the confidence of all who have technical knowledge.

The act of appointing as Minister a man who really knows the workings of the department which he is to control is so entirely subversive of all political precedent that one is violently tempted to think that there must be something wrong somewhere. Yet even the chronic malcontents, the hypercritical, and the ultra-suspicious have not yet been able to discern the proverbial nigger in the wood-pile. It actually seems as if, for once in the disastrous political history of this war, the Government has done the right thing. It must obviously be an accident, but it is certainly the happiest accident that could have happened.

All the best things in life happen by accident, and Sir William Weir's appointment seems to be one of them. Or perhaps one might better ascribe the present promising position to that form of accident which consists in possessing that inherent faculty for seizing the tide in the affairs of men which, taken at the flood, leads on to fortune. To continue the simile beyond the point to which Shakespeare used it, one may point out that the skipper who catches the right tide brings fortune not only to himself, but to those who are in the same boat with him and to the owners of the boat. One hopes that such may be our case, and that the arrival of Sir William Weir on the flood tide following the low tide which stranded Lord Rothermere may bring good fortune to all in the Air Force boat and to the owners of the boat, who are the King and his people.

Navigating Difficulties.

Even those who travel on the flood tide of good fortune have, none the less, their difficulties of navigation, and few who have started with everything in their favour have had more snags ahead than the Air Minister. It seems well, therefore, to point out briefly where the chief of those snags lies, so that twelve months or so hence we may look back and see how he has acquitted himself as skipper of this all-important craft.

It would need volumes to deal with each of the difficulties which beset the Air Minister, who has under him so many defectively organised departments that no one man could possibly hope to set them all straight himself in one human life-time. Therefore the chances of success depend entirely on the Air Minister's ability to choose his subordinates and to delegate his duties to them. In this direction Sir William Weir has already shown great capacity. In fact he would himself be the first to ascribe his own success to the loyalty and ability of his assistants. Which is the best proof that he has the priceless gift of knowing a good man when he sees him, and of letting him do his job in his own way.

The C.-in-C. Air Forces.

Before starting on problems of internal organisation, however, there are two great tasks for the Air Minister to fulfil.

The first is, obviously, the appointment of General Sir Hugh Trenchard to his proper position, where his military genius and his gift of leadership may be fittingly and fully employed in winning the war.

As one ventured to suggest last week, the only position worthy of General Trenchard is that of Commander-in-Chief, Allied Air Forces. What General Foch is on the ground, General Trenchard should be in the air.

Already there is a tendency to talk of General Trenchard as "the Foch of the Air." One submits, with all the respect which is due to the high military qualities of the Generalissimo, that Sir Hugh Trenchard's own qualities are such as to make it unfitting to describe him by the name of anyone else. One might as reasonably talk of General Foch as "the Trenchard of the ground."

In his own department of war General Trenchard stands alone, as a strategist, as a tactician, as a psychologist, and as a leader of men. If there exists in any Army a leader for whom his men have the same blind personal devotion and in whose military ability they have at the same time time the same implicit trust, he has yet to become known.

It is therefore merely obvious that the first task of the Air Minister is to assure that the services of the great leader of the Air Force are made immediately available for the good of the Allies' cause.

The Sea and Land Question.

The next great question to be settled is the division of the land and sea sections of the Royal Air Force. Daily one sees increasing the absurdity of mixing soldiers and sailors and expecting them to do their jobs properly.

Beyond the mere Aero Club Certificate stage of training the whole of the work of the two branches is utterly different. Even before that stage the time which a pupil spends on the ground should be spent in learning the Service side of his work as distinct from flying, and it is pure wicked waste of time to try to teach armies of cadets both the soldiering and sailoring side of their jobs.

A soldier is a soldier and a sailor is a sailor, and the thing which the daily papers call an "airman" may be either, but he cannot possibly be both. The level of

intelligence in this country—or any other—is not so high that a youthful cadet can learn fully in a few months all that there is to know about his own job. Even on the military side alone it is straining the lads' intellects past their proper load-point to try and teach them fighting, bombing, reconnaissance, photography, and so forth, all at once. It takes them all their time to learn one single part of the military side alone, to the degree of being highly efficient. Surely, then, the utter folly of mixing up sailoring as well is obvious.

If it is the intention to take a fully trained military aviator and turn him over to a seaplane ship or coast station to learn sailoring, then the waste of time spent on his previous education is still more ludicrous.

People have said that the Royal Marines learn soldiering and then serve on board ship, and that the R.A.F. can do likewise. The cases are not in the least analogous. The Marine is a fighting man and nothing else. The naval aviator has to be a navigator, and he has to talk Navy-talk on his wireless to the ships with which he is working, or else he is useless. He has to be all of a sailor, "and then some"—as the Americans say.

The idea of a combined Air Service to act either as an ancillary Service to the Navy and Army, or as a separate striking force, is purely imbecile. For supply only, an Air Ministry may be excellent. For administration, it may be a possibility. For operations it would be not only an abject futility, but it is a danger to the country.

Administration.

Even as regards administration, the Third Service idea is half an absurdity and half a public nuisance. One finds case-hardened Harveyised senior Naval officers getting tied into knots over military customs and regulations which are a matter of course to the majority of those under them. One finds aged admirals in command of vast numbers of troops on the ground, after having spent all their lives in charge of a few ships at sea. One finds soldiers trying to discover the meaning of the language of seaplane stations.

One finds wearied and worried Provost Marshals and A.P.Ms. heating up telegraph and telephone wires in an endeavour to find out who is to deal with the "crimes" of Air Force mechanics, for none seems to know whether a drunken air mechanic at Southend may be arrested by the Military Police, or whether it is necessary to send for a Naval picket from Sheerness, or an Air Force escort from Birmingham, or a Metropolitan policeman from Bow Street, or a janitor from the Hotel Cecil, to take him in charge. All this could have been avoided by following the obviously simple course of making the Naval aviator a real sailor, and letting the Military aviator remain a member of what Colonel Seely called "the *Corps d'Elite* of the British Army."

The Clean Cut.

However, now the harm is done, for the time being. But the sooner the Air Minister makes a clean cut between the Naval and Military branches of the R.A.F. the better it will be for both the Services, the greater will be the efficiency of the Air Force as a whole, and the higher will be his reputation in history as a statesman and as an administrator.

If the mere politicians insist, let the R.A.F. remain as such, but let the Air Minister cut the Naval side clean away from the soldiering side. When a cadet joins the Force, let him decide whether he is going to be a soldier or a sailor—if there are vacancies in both branches—and let him be trained entirely as such. Let present officers of the R.A.F. decide to which branch they will belong. Then we shall remove existing friction, owing to incompatibility of training, manners, and customs, and we shall promote healthy rivalry and competition between the Naval and Military sides.

Incidentally, what is the right word for the individual of the R.A.F.? Comparatively few of them are "airmen" in any sense of the word, for even in an Air Force which was 100 per cent. efficient there would be between thirty and fifty people on the ground for every one in the air. In a hermaphrodite Service, where the groundling is not sure whether he is a soldier or a sailor, what is one to call him? A facetious friend suggests that he should be called a "solaildier," by way of combining the two and suggesting at the same time that he also is entitled to a place *au soleil*—or in the limelight, if he likes it better.

Political Representation.

One very excellent arrangement as concerns the Air Minister is that he is to have a seat in the House of Lords, and not in the Commons. Sir William Weir's quiet and straightforward methods are better suited to the élite of the nation than to the elected of the people. When it is necessary for him to make a public statement it is more fitting that he should deliver it in the calm and dignified atmosphere of the Upper House than amid a "dog-fight" in the Lower Chamber. Apart from which, few men have better deserved a peerage than has Sir William Weir.

But, if he is to be worthily represented in the Commons, it will be well for him to secure a better representative than Major Baird. Granted that politicians are best met by politicians, it is possible for a politician to be a statesman also—Mr. Ian MacPherson is a case in point.

Major Baird is entirely unsuited to the position which he holds. His manner is as offensive as was that of Mr. Tennant, and he lacks Mr. Tennant's ability. His displays of temper are lamentable, even in an assembly possessing such slight relics of dignity as does the House of Commons. And his regard for veracity of statement is subject to as frequent lapses as is his equanimity of deportment.

So impossible is he that even the conventionally respectable members of the Parliamentary Air Committee avoid putting down questions for him to answer, and work them round on side-issues to the representatives of other departments. By such means alone can they expect to receive at once a civil and reasonably accurate reply.

Unapproved Methods.

As an example of Major Baird's methods, one recalls that some time ago a certain member of Parliament, pleading for that standardisation of aero-engines with which the present Air Minister is so fully in agreement, read out a list of some 60 or 70 engines of different types, all of which have been in use since the beginning of the war, and most of which have been used quite recently in one way or another. Major Baird, in one of his usual displays of temper, gave him the lie direct, though as a matter of fact the list of types was extremely accurate.

If one could get at official figures one would probably find that one or more of all the types mentioned were still "on charge" within a very few months of the statement being made, so that the list was just about as nearly accurate as were the figures given by General Henderson at or around the time of the Air Enquiry Committee for the number of engines then "on charge," when certain critics alleged a shortage of engines. And it was very much more accurate than the figures given officially by Colonel Seely, as Minister for War, for the number of aeroplanes in flying condition—figures which were proved by Mr. Joynson-Hicks to have been falsified.

Shortly after this affair in the House, Major Baird, speaking at a gathering of important people concerned

with the aircraft supplies of our Allies, said, in his jaunty way, that he always recalled the advice of his former chief, Lord Cromer, "never to miss an easy one," and proceeded in self-glorification to relate how he had shortly before easily defeated a member of Parliament who had charged the Air Ministry with using "61 different types of machines." Now, please note that no reference had been made in the House to types of machines at all, but that by simply substituting the word "machines" for the word "engines." Major Baird put an entirely different aspect on the matter and represented himself as scoring heavily off his opponent.

If Major Baird pretends to have forgotten the incident, let me remind him of the occasion when, though a young man and a comparatively junior officer, he took it upon himself to rebuke the distinguished chairman for speaking of the Air Board instead of the Air Ministry, and proceeded to refer to himself immediately afterwards as "the representative of the Air Board." The *faux pas* was intensified by the presence at the same table of a voting member of the old Air Board—which Major Baird never was, being merely a Secretary—who was also a very highly-placed personage in the Air Council, so that Major Baird appeared somewhat presumptive in taking upon himself to speak in any other than his proper capacity.

None will be able to feel that justice can be done to the Air Minister's great work so long as he is misrepresented in the House of Commons. Though we live in an age of substitutes, a genteel man is no substitute for a gentleman as the representative of a Government department. A display of temper is no substitute for the exhibition of moral strength. Jauntiness and cheap attempts to score are no substitutes for wit and satire. And the manner and accent of a soldier as imagined by an exponent of a staged version of a Ouida novel are no substitutes for the genuine articles. Indubitably the Air Minister needs a representative in the House of Commons who is worthy of his high responsibilities to the King and his people.

The Task Inside the Air Ministry.

These matters affect Sir William Weir purely in his external work as Air Minister. But the internal affairs of the Air Ministry demand his attention no less than they did when he was Director-General of Aircraft Production. Possibly as Air Minister he may have more power to have his own way than he had as D.G.A.P.

Certainly the best way to obtain efficiency in the Hotel Bolo would be to burn the whole place down, being particularly careful not to salve any scrap of paper in it, and then start work afresh in an open field under canvas, where God's clean air could blow through everything.

The Technical Department in particular needs a thorough overhaul.

The Timber and Dope Scandals.

The first executions should take place among the people who are responsible, primarily for the shortage of timber generally and of spruce in particular, and secondly for the non-provision of proper substitutes and the passing of improper substitutes.

Then some disappearances might with advantage take place in the Dope Department, among the people who after bullying and irritating the hard-working dope manufacturers, all of whom have been doing very good work, have lately decided to use nothing but a standard dope. Experienced chemists state that this stuff will be practically worthless for its purpose, in that it will double the amount of work necessary to keep machines in order at the front, and will necessitate the redoping of all spares and machines kept in store at home for more than a few weeks before they are put into service.

The same people are apparently responsible for the entirely unnecessary use, and therefore the waste, of linseed oil in pigments for aeroplanes. One is under the impression that linseed is excellent feeding stuff for cattle and pigs, and that therefore they are wasting the nation's food. All the material necessary for pigments can be got out of what are now waste products from other war materials.

If the people in the dope and paint department do not know this they are not fit for their jobs. And if they do know it and allow the waste to continue, they are still less fit for their jobs.



An Official Photograph taken on the British Western Front in France.

A.I.D. Wastage.

One gathers that the Aeronautical Inspection Directorate is now under the D.G.A.P. and not, as one would think it ought to be, under the Controller-General of Equipment. In any case, the A.I.D. badly needs overhauling. There are many excellent people in it, and many of them do valuable work, but half the personnel would do still better work. The people who are responsible for all the ridiculous, time-wasting, labour-wasting "procedure" should be executed first. Those who are responsible for laying down absurd limits and so forth might perhaps be conceded the privilege of watching the others expire first.

Testing New Types.

A department which deserves something special in the way of executions, "something humorous with boiling oil in it," is that particular one which deals with the testing and choice of new machines. Instead of getting a test through in a matter of days and sending in a full and precise account of the performance, as the R.N.A.S. test station used to do, this department keeps machines hanging round literally for months before completing tests.

One knows at the moment of at least two machines specifically, both far superior to anything in use at the front at the moment, which have been in existence in their present form for between two and three months, and which by now, under any properly managed department, would be in production in quantities, and would be in use to quite a considerable extent by the R.A.F. in the field. Yet so far all this precious department has done is to play with them as if they were interesting scientific toys, turned out for the delectation of the university professors and budding investigators who seem to run the department.

A Grave Warning.

This department, whose identity and location cannot well be mistaken, has become as grave a menace to the active-service pilots and to the R.A.F.'s superiority in the air as was the Royal Aircraft Factory in the old days. One desires to warn the Air Minister and the Director-General of Aircraft Production, in all seriousness, that unless this department is completely reorganised and placed under the control of people who are more anxious to win the war than they are to enhance their private reputations as scientists, a most serious wrong will be done to the active-service pilots.

This warning is hereby recorded in print. *Litera scripta manet.* It will be available for reference in a year's time when the follies of the department will be bearing fruit if they are not stopped at once.

People who detach air-screw bosses with a hack-saw to save the trouble of undoing a few screws, and who keep a new-type machine fooling about in the air while they listen to its beautiful engine notes, instead of putting it through its tests and into production, are certainly not fit to be trusted with work of vital importance in war time. The same people have already, either from ignorance or from personal incapacity, damned at least two of the best machines which this country has ever produced. They have kept machines out of the quantity-production stage for months, with their pseudo-scientific buffoonery. They are definitely a menace to the active-service pilots, and their deleterious activities must be stopped, just as the Royal Aircraft Factory was stopped. And they must be stopped in a very much shorter time.

It took two years of war to make the R.A.F. innocuous. We cannot afford at this stage of the war to waste another two years in cleaning out the hangers-on of the Technical Department.

Good Wishes.

The Air Minister has begun his task under the most favourable possible auspices. We all expect great things of him. One hopes in all sincerity that he will maintain his high reputation, and that he will help the Royal Air Force to victory. One hopes, above all, that he will not, as in the notable example of a very distinguished officer, break himself through persisting in backing the wrong horses in spite of the warnings of those who wished him well.

Sir William Weir is a brave man to have taken on the job of Air Minister after seeing how easily Lord Rothermere was broken. It is, as a wise soldier of one's acquaintance remarked some time ago, far easier to break a Cabinet Minister than it is to break a general or a permanent official. One hopes therefore that the Air Minister will start by breaking all the inefficient officials below him, and will consolidate his own position among their débris.—C. G. G.

GENERAL TRENCHARD'S APPOINTMENT.

On May 2nd **Maj. Baird,** Parliamentary Secretary to the Air Board, asked by Mr. R. M'Neill what position in the Air Service was to be occupied by Sir Hugh Trenchard, and what were the duties of that position, said his right hon. friend was giving this matter his closest attention, but he was not yet in a position to authorise him to make a definite statement on this subject. He was engaged in reviewing the whole position of the Air Force, with the object of deciding what post would give the best scope for the utilisation of General Trenchard's great qualities. The hon. member would easily appreciate that a decision of this importance ought not to be rushed.

Mr. R. M'Neill: May we take that as an assurance that in this case we are not going to be put off, as in the case of Lord Jellicoe?

Maj. Baird: I really think that is not a fair thing to say about my right hon. friend. My right hon. friend has only just taken over office in this new force, and he must make himself conversant with it before he can be called upon to give a decision.

Mr. Chancellor asked whether it would not be necessary to invent or create some new position for General Trenchard.

Maj. Baird: No; decidedly not. Neither the Secretary of State nor General Trenchard would consent to any course of that kind.

WHO'S WHO IN OFFICIALDOM.

In answer to Mr. George Terrell, who asked the Minister of Munitions to furnish particulars of the 70 departments and the name of the chief official in charge of each, Mr. Kellaway gives a list of the principal departments and the names of the officials in charge, among which are the following:—

Finance Group.—Aircraft and Explosives Finance: Sir Philip Henriques, K.B.E., director.

Ordnance Group.—Controller, Timber Supplies: Mr. D. Bain, C.B.E.

Air Group.—Aircraft Production: Director-General, vacant owing to the appointment of Sir W. Weir as Air Minister; Assistant Director-General, Sir Henry Fowler, K.B.E. Controllers: Supply, Brig.-Gen. W. Alexander, D.S.O., and Technical, Lt.-Col. J. G. Weir, C.M.G.; Director, Inspection, Lt.-Col. R. K. Bagnall-Wild; Controller, American Assembly, Mr. Alexander Duckham.

Engines Group.—Controller, Mechanical Warfare, Vice-Adm. Sir A. G. Moore, C.V.O.; Commissioner, Mechanical Warfare (Overseas and Allies), Lt.-Col. A. G. Stern, C.M.G.; Director, Agricultural Machinery, Mr. H. C. B. Underdown; Controller, Machine Tools, Mr. E. M. Iliffe; Directors, Mechanical Transport, Lt.-Col. C. V. Holbrook, and Electric Power Supply, Mr. A. Gridley.

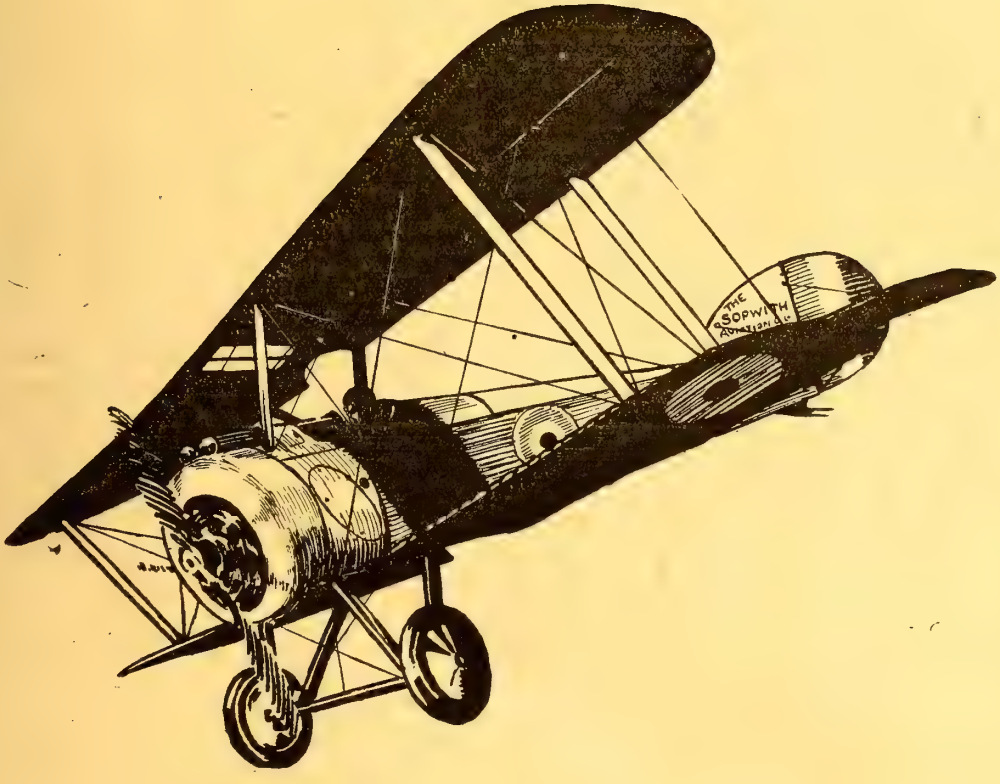
Labour Group.—Labour Regulation, Controller (ranking as an Assistant Secretary), Mr. H. Wolfe, C.B.E.; Directors, Labour Supply (Civil), Mr. T. M. Taylor, C.B.E.; Military, Mr. J. A. Barlow, C.B.E.; Labour, Adviser, Sir Thomas Munro, K.B.E.; Director-General, Lands (for War Office and Ministry of Munitions), Sir Howard Frank, F.S.I.; Chairman, Munitions Works Board, Mr. J. Carmichael, J.P.

A LOYAL ACKNOWLEDGMENT.

The following telegram published on May 6th has been received by the Queen from the Royal Air Force, Middle East:—

The Royal Air Force, Middle East, which includes all those who are serving with the Expeditionary Forces in Palestine, Egypt, Salonika, and Mesopotamia, and also the Australian Flying Corps in this theatre, desires to thank H.M. the Queen for her gracious message, which by its courage and sympathy inspires the determination of all.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS SBAC

Paris Office:
21, RUE DU MONT THABOR.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

A CERTIFICATE OF ACHIEVEMENT.

Officers relinquishing their commissions are to be eligible for a special certificate from the King. This concession, which is set out in an Army Order, applies to those discharged :—

(a) After service overseas in a theatre of war with an Expeditionary Force in the present war and who have been invalided on account of wounds or ill-health caused or aggravated by military service.

(b) On account of disablement certified, under the authority of the Army Council, to be directly attributable to the action of the enemy—e.g., air or naval raids.

(c) Previous to transfer to the R.F.C. or R.A.F., on account of disablement certified under the authority of the Army Council to have been caused or aggravated by military service while engaged on flying duty in connection with operations against the enemy other than in a theatre of operations.

The King has also approved the issue of a special certificate, to be entitled the King's Second Certificate, to officers who, after the award of the King's Certificate, voluntarily rejoin, and are again discharged in the same circumstances. Special certificates of discharge are to be issued to all warrant officers, N.C.Os, and men who have served since August 4th, 1914, and who have been discharged as no longer physically fit for war service. Ex-officers seeking the certificates should write to War Office (M.S.2C), 8, Bedford Square, W.C.1.

SIR HENRY NORMAN'S RESIGNATION.

On May 6th, replying to **Mr. P. A. Harris** (Harborough, L.), who asked whether Sir H. Norman had resigned his position on the Air Council; and, if so, what was the reason for his resignation, **Maj. Baird**, Parliamentary Secretary to the Air Council (Rugby, U.), said :—The reply to the first part of the question is in the affirmative. The right hon. baronet the member for Blackburn, having been appointed to the Air Council by the late Secretary of State, naturally placed his resignation in the hands of the new Secretary of State, who accepted it, having decided that it is desirable to reduce the size of the Air Council. The vacancy has not been filled.

THE AIR COUNCIL AND LAND.

An Order in Council has been made applying to the President of the Air Council with some modifications certain statutes which confer on the military authorities power to acquire, hold, and manage land for the Services under their control. The statutes dealt with include the Defence Acts, 1842, 1854, 1859, and 1860, the Ordnance Board Transfer Act, 1855, the Militia (Lands and Buildings) Act, 1873, and the Military Lands Act, 1892. The Order may be cited as the Air Force (Application of Enactments) (No. 1) Order, 1918.

THE WOMEN'S ROYAL AIR FORCE.

The Secretary of State for the Royal Air Force has appointed the Hon. Violet Douglas-Pennant to be Commandant of the Women's Royal Air Force, her services having been lent for the purpose by the chairman of the National Health Insurance Joint Committee.

Miss Douglas-Pennant, who was born in 1869, is the sixth daughter of the second Lord Penrhyn, and sister of the present peer. She has given proof of marked administrative ability as an Insurance Commissioner for Wales, a post which she has held since 1912.

A BAIRD BLUNDER.

From the "Morning Post" of May 6th :—

SIR,—It is a pity that our Ministers are sometimes so unfortunate in the way they express themselves. In the debate on Monday last the Under-Secretary to the Air Ministry is reported as having said that "the quality of pilots had steadily increased."

Those of us who know anything about it know that what he intended to convey was that the efficiency of our pilots had increased. This is due to the immense improvement in their training.

Two years ago—thanks to the neglect of our politicians of our preparation for war and to their dilatoriness after war began—our boys were sent to the front after just half the time for training that is given to them now. Owing to the shortage of pilots they were kept out there after they were due for a rest and for a term of home service. How many of these gallant boys of 18 and 19 threw their lives into the breach to make good our neglect to prepare an Air Service to meet that of our enemies?

It surely is not unreasonable that those who, by sad experience, know these things should expect from a Minister reviewing the present position of our splendid Air Force something better than words which can be taken to compare the quality of the present gallant pilots with the no less gallant ones who, alas! are mostly gone. The quality of the latter was the same; the improvement is in the way that the Government are now doing their duty by their successors.—Yours, etc.,

May 4th. N. S.

NAVAL SERVICE CHEVRONS.

The Secretary of the Admiralty has made an announcement with regard to the conditions of the award to members of the Royal Navy and the other marine services of chevrons for service at sea or oversea.

Chevrons will be awarded to denote services oversea or at sea undertaken since August 4th, 1914, and are to be worn in uniform. Applications and correspondence from serving officers and men with regard to chevrons are not to be addressed direct to the Admiralty, but are to be dealt with by their commanding officers in the first instance.

The following among others will be eligible for the award subject to the conditions laid down :—

Officers and men of the Royal Naval Air Service up to April 1st, 1918.

Service oversea and at sea is defined as follows :—

Service at sea is service in sea-going ships of war and auxiliaries, it does not include service in hulks and harbour vessels, nor in harbour craft which are tenders to such vessels, except in those which are employed in minesweeping.

Officers and men of the late Royal Naval Air Service who, although serving in the United Kingdom, were liable for service in the air for offensive or defensive purposes, may count such service as qualifying service. Service in kite balloons when embarked in ships will also count.

The date for the award of the first chevron will be August 5th, 1914, in the case of those serving at sea or abroad on that date, and in other cases the date on which the individual began or begins qualifying service as defined—for example, an individual who began qualifying service on Dec. 31st, 1915, is entitled to his first chevron on that date. In the case of officers and men of the Naval Forces of the Dominions the date will be the date of being drafted to a seagoing ship or leaving their own country.

Additional chevrons are to be awarded as follows :—

(a) From Jan. 1st, 1915, to Dec. 31st, 1917, inclusive, on a calendar year basis; that is, one chevron and not more than one for each of the years 1915, 1916, and 1917. The individual must have an aggregate of three months' qualifying service in the calendar year to entitle him to the award for that year. An additional chevron is not to be given for the calendar year in which the first chevron is awarded. Service cannot be added from one calendar year to another. Periods in prison, detention or in captivity as a prisoner of war are not to count towards the three months' qualifying service. Note.—Should an individual have been wounded on active service and not have the necessary three months' qualifying service for the calendar year in which he was wounded, he is, nevertheless, to be awarded the chevron for that year, subject, however, to the condition that more than one chevron cannot be obtained in any one calendar year.

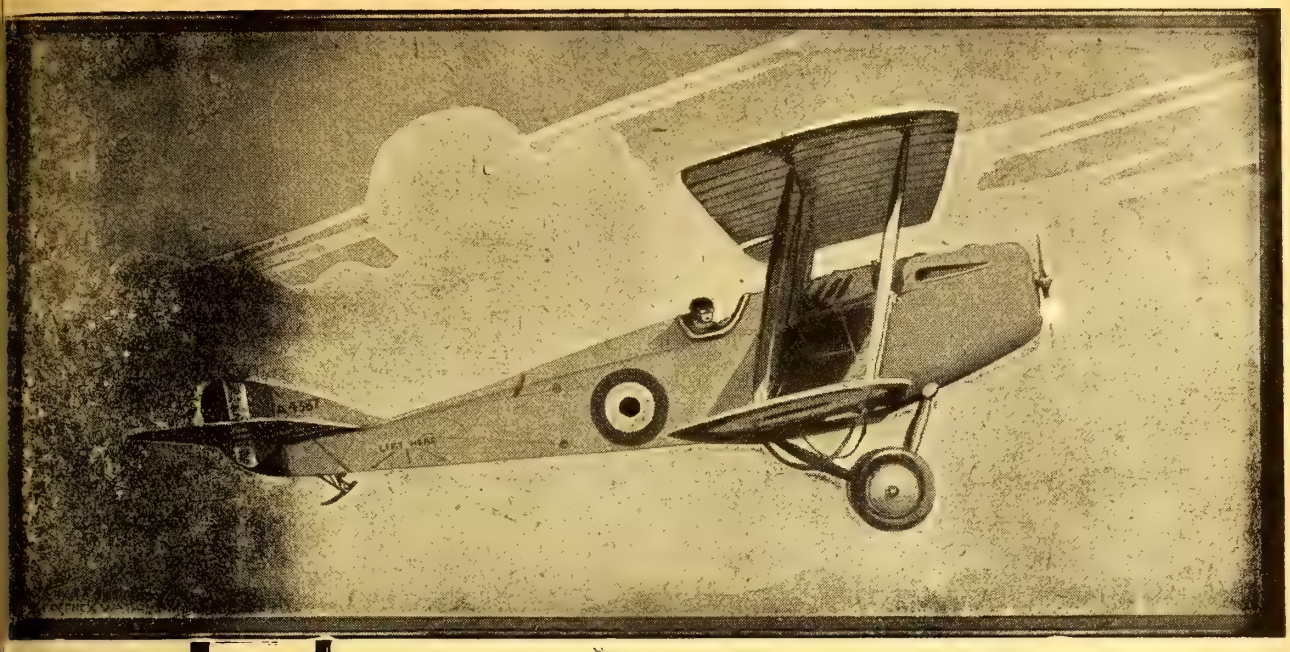
(b) From Jan. 1st, 1918, onwards, one chevron for each successive aggregate period of 12 months' qualifying service. This service need not be continuous. It will include short periods of leave where the individual returns to service at sea or overseas at the conclusion of such leave. Periods of absence without leave, in prison or detention, in hospital from sickness due to avoidable causes, or in captivity as a prisoner of war are to be excluded in calculating the 12 months required to qualify for an additional chevron. Note.—No service prior to Jan. 1st, 1918, is to count towards the 12 months' qualifying service.

The chevrons will be ½in. in width, the arms 1½in. long. They will be worn inverted on the right forearm. Chevrons for officers will be of silver or gold braid. The first chevron, if earned on or before Dec. 31st, 1914, will be silver; if earned on or after Jan. 1st, 1915, it will be gold, and all additional chevrons after the first will be gold. The silver chevron will be worn below the gold one. For ratings they will be of worsted embroidery of two colours—red and blue. The first chevron, if earned on or before Dec. 31st, 1914, will be red; if earned on or after Jan. 1st, 1915, it will be blue; and all additional chevrons after the first will be blue.

In the case of officers they are to be worn on the blue undress coat only.

The chevrons are a distinction to be worn on uniform to denote service at sea or overseas since the outbreak of war, and are not to be regarded as being in the nature of a reward. There will, therefore, be no posthumous award to fallen officers or men. The chevrons may be worn in plain clothes by officers and men who have left the Service, but who would, had they remained in the Service, have been entitled to wear them on uniform. In such cases, application for authority to wear the chevrons must be made.

It is an offence under the Defence of the Realm Regulations for any unauthorised person to wear a chevron or chevrons, and it should be noted that under Regulation 41, sub-paragraph (c), it is an offence for any person to supply, without lawful excuse or authority, one of these chevrons to an unauthorised person.

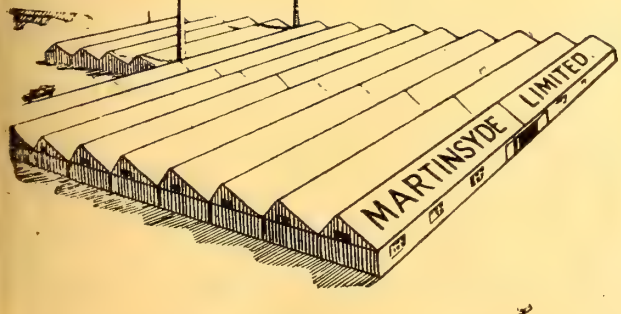


The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds all World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE



BROOKLANDS.
Head Office

WOKING, Surrey.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS



NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

War Office, April 30th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Equipt. Officers, 1st Cl.—From the 2nd Cl., and to be temp. Capts. while so empld., March 30th:—Lt. A. J. M. Ross, Spec. Res. Temp. Lts., Gen. List:—W. B. Everton, E. F. Moulder, A. Howard, A. W. H. Phillips, N. Liddall, Lt. D. Drover, Spec. Res., Temp. Lt. P. M. Brambleby, Gen. List.

Memoranda.—Temp. Hon. Lts. to be temp. Hon. Capts.:—E. L. Mann, while empld. as Inspr., Aeronautical Prodn. Dept., Oct. 1st, 1917; W. W. Ward, R. J. Butterworth, April 20th.

Air Ministry, April 30th.

R.A.F.—Flying Branch.—To be temp. Lt.-Cols. whilst empld. as Lt.-Cols. (Flying):—Maj. R. A. Bradley, April 11th; Maj. F. K. Haskins, D.S.C., April 17th.

To be temp. Majs. whilst empld. as Majs. (Flying).—Capt. L. J. R. A. Bayly, M.C., Capt. C. Cooper, Capt G. M. Croil, Capt. F. L. Robinson, M.C., April 11th; Lt. (temp. Capt.) A. H. Peck, D.S.O., M.C., April 13th.

Lts. to be temp. Capts. whilst empld. as Capts. (Flying):—(Hon. Capt.) W. Ashton, P. J. Barnett, M.C., D. H. Bell, M.C., R. B. Bourne, A. D. C. Browne, C. C. L. Dowdall, D. H. de Burgh, D. R. C. Gabell, D. A. Hansard, A. A. Harcourt-Vernon J. S. Hodges, W. E. Holland, B. G. King, J. Mundie, G. H. Plowman, W. E. Reed, R. G. Rolfe-Rogers, A. J. Salton, J. Seabrook, C. G. Sturt, J. B. Tait, C. E. Ward, C. M. White, G. E. Wilson, April 1st; (Hon. Capt.) S. M. Kinkead, D.S.C., April 5th; O. C. Bridgeman, April 6th; H. V. Puckridge, April 7th; E. D. G. Galley, April 9th; (Hon. Capt.) A. T. Wheatly, D.S.C., April 9th, 1917; C. T. Brown, (Hon. Capt.) B. A. Millson, H. A. Rigby, (Hon. Capt.) V. E. Sieveking, D.S.C., April 11th; (Hon. Capt.) A. C. Burt, E. H. Comber-Taylor, G. L. Ormerod, April 13th; (Hon. Maj.) G. T. J. Barry, W. Mitton, E. Pybus, April 17th; P. W. Rutherford, M.C., R. C. St. J. Dix, M.C., April 19th; B. E. Catchpole, April 22nd; H. A. Mason, April 23rd.

Maj. W. T. Rutledge resigns his commn., May 1st.

Lt. M. Bird relinquishes his commn. on ceasing to be empld., April 10th.

Lt. G. R. Carmichael relinquishes his commn. on account of ill-health contracted on active service, May 1st.

Lt. (Lt., 1st Cent. Ont. R.) F. A. Loosley resigns his commn., May 1st.

Sec. Lt. M. Corrie relinquishes his commn. on account of ill-health contracted on active service, May 1st.

Administrative Branch.—Maj. B. O. Jenkins, C.B.E., to be temp. Lt.-Col., without the pay and allowances of that rank, while specially empld., April 22nd.

To be temp. Capts. while empld. as Admin. Capts.:—Sec. Lt. E. P. Dampier, Lt. R. A. Trelease, Lt. R. M. Ward, April 1st; Lt. G. G. Fiddes, Lt. F. Petch, April 30th.

Sec. Lts. to the temp. Lts. while empld. as Admin. Lts.:—W. Brackenbury, H. J. Clark, A. L. Freeman, J. H. Thorpe, E. W Vine, P. A. Wright, April 22nd; E. J. Dowty, April 26th; A. H. Simpson, April 30th

Lt. (temp. Capt.) (temp. Capt. K.R. Rif. C.) A. E. Marshall relinquishes his commn. on ceasing to be empld., April 8th.

Lt. (temp. Lt., Rif. Brig., attd.) H. J. Lord relinquishes his commn. on ceasing to be empld., May 1st.

Sec. Lt. M. A. McKenzie relinquishes his commn. on account of ill-health contracted on active service, May 1st.

Technical Branch.—Maj. G. Laing to be temp. Lt.-Col. while empld. as Lt.-Col. (Tech.), April 1st.

Capt. O. V. Thomas to be temp. Maj. while empld. as Maj. (Tech.), April 30th.

To be temp. Capts. while empld. as Capts. (Tech.):—Lt. D. R. Pye, April 6th; Lt. L. J. Stuart, April 15th.

Sec. Lt. A. H. Brown to be temp. Lt. while empld. as Lt. (Tech.)

Sec. Lt. W. A. C. Allen relinquishes his commn. on account of ill-health, May 1st.

The rank of Lt.-Col. (temp. Brig.-Gen.) C. L. Lambe, C.M.G., D.S.O., is as now stated, and not as in the "Gazette" of April 5th.

Admiralty, May 1st.

The King has been pleased to approve of the award of the following honours, decorations and medals to officers and men of the Royal Naval Air Service for zeal and devotion to duty during the period from July 1st to December 31st, 1917:—

The Distinguished Service Order.

Sqdn. Comdr. C. R. F. Noyes, R.N.; Sqdn. Comdr. V. Nicholl, D.S.C., R.N.A.S.

The Distinguished Service Cross.

Flt. Comdr. G. G. H. Cooke, R.N.; Flt. Comdr. W. G. Sitwell, R.N.; Flt. Comdr. W. H. Wilson, R.N.A.S.; Flt. Comdr. E. de C. Hallifax, R.N.A.S.; Flt. Comdr. W. F. Horner, R.N.; Flt. Lt. (actg. Flt. Comdr.) B. E. P. Gregg, R.N.A.S.; Flt. Lt. (actg. Flt. Comdr.) J. K. Waugh, R.N.A.S.; Flt. Lt. (actg. Flt. Comdr.) C. Gilmour, R.N.A.S.; Flt. Lt. W. Underhill, R.N.; Flt. Lt. C. C. Carlisle, R.N.A.S.; Flt. Lt. F. N. Halstead, R.N.A.S.

Flt. Lt. H. Wilkins, R.N.A.S.; Flt. Lt. R. S. Montague, R.N.; Flt. Lt. E. G. Hopcraft, R.N.A.S.; Flt. Lt. K. F. Saunders, R.N.A.S.; Flt. Lt. S. E. Taylor, R.N.A.S.; Flt. Lt. C. H. Fitzherbert, R.N.A.S.; Flt. Lt. D. Knowles, R.N.A.S.

Flt. Lt. F. S. Mills, R.N.A.S.; Flt. Lt. G. M. F. O'Brien, R.N.A.S.; Flt. Lt. T. O'Connor, R.N.A.S; Flt. Lt. A. R. T. Pipon, R.N.A.S.; Flt. Sub-Lt. (actg. Flt. Lt.) E. E. Maitland-Heriot, R.N.A.S.; Flt. Sub-Lt. N. H. Woodhead, R.N.A.S.

The Distinguished Service Medal.

Actg. Air Mech., 1st Gr., W. H. Allan, O.N. F.21833; Ldg. Mech. (E.) E. F. Anthony, O.N., F.4874; Ldg. Mech. W. C. Argent, O.N. F. 13496; C.P.O. Mech., 1st Gr. (C.), J. F. Armitt, O.N. 343587 (Ch.); C.P.O. Mech. (W.) A. W. Ayres, O.N. F.9322.

C.P.O. Mech., 2nd Gr. (E.), H. R. Beckett, O.N. F.477; P.O. Mech. (E.) G. F. Blyth, O.N. F.13884; P.O. Mech. (E.) G. S. Browning, O.N. F.2836; Ldg. Mech. W. H. Butt, O.N. F.13613.

Ldg. Mech. (E.) G. J. Chandler, O.N. F.12523; C.P.O. Mech., 2nd Gr., W. J. Coadwell, No. R.M. Po./15413; P.O. Mech. R. Connor, O.N. F.4597; Ldg. Mech. (E.) W. G. Cornell, O.N. F.5262; C.P.O. Mech., 3rd Gr. (E.), A. E. Crispin, O.N. F.2519; Actg. P.O. Mech. C. Curtis, O.N. F.3843.

P.O. Mech. D. T. Davies, O.N. F.17941; Actg. Air Mech., 1st Gr. R. J. Davis, O.N. F.14902; C.P.O. Mech., 3rd Gr., W. G. C. Davis, O.N. F.4992; C.P.O. Mech. G. W. Denmark, O.N. F.14195; C.P.O. Mech., 3rd Gr., J. R. Douglas, O.N F.2154; Ldg. Mech. P. Durrant, O.N. F.7501; C.P.O. Mech., 2nd Gr., P. A. B. Dyke, O.N. F.3624.

Ldg. Mech. W. A. East, O.N. F.132; P.O. Mech., 1st Gr., S. J. Edwards, O.N. 191047 (Ch.); P.O. Mech. G. H. Ellis, O.N. 13423.

C.P.O. Mech., 1st Gr., B. J. Fearn, O.N. F.403; P.O. W. Feldwick, O.N. 117557 (Po.).

C.P.O. Mech., 3rd Gr., G. J. Gawthorn, O.N. F.3781; Ldg. Mech. G. Greenwood, O.N. 227264 (Po.); C.P.O. Mech., 2nd Gr., A. E. Groom, O.N. 235356 (Ch.).

Air Mech., 1st Gr., A. M. Hallawell, O.N. F.12258; P.O. Mech. (E.) E. A. Harrison, O.N. F.1860; Actg. Air Mech., 1st Gr. (E.), J. Hawes, O.N. F. 18509; Air Mech., 1st Gr., H. E. Hayes, O.N. F.6644; Actg. Air Mech., 1st Gr., W. S. Hemery, O.N. F.5846; Actg. Air Mech., 1st Gr., D. Henderson, O.N. F.23608; Ldg. Mech. R. L. Hobson, O.N. F.19727; P.O. Mech. H. Hosmer, O.N. F.2687; P.O. Mech. D. J. Hull, O.N. F.2250.

Actg. Air Mech., 1st Gr., A. H. Johnson, O.N. F.18174; C.P.O. Mech., 3rd Gr., A. Jones, O.N. F.4532.

A.C., 2nd Gr., J. W. Key, O.N. F.31161.



WM.

COLE & SONS

LIMITED,

Aircraft Manufacturers.

Contractors to H.M. Government.

235, HAMMERSMITH RD., LONDON, W.6.

Telephone: Hammersmith 1413-4.

Harman Advt. Co.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS

P.O. Mech. T. Matthews, O.N. F.2204; C.P.O. Mech., 2nd Gr., W. R. Mayes, O.N. F.695; C.P.O. Mech., 3rd Gr., F. Miller, O.N. 223410 (Dev.).

C.P.O. Mech., 3rd Gr. (E.), S. W. Painter, O.N. F.314; C.P.O. Mech., 2nd Gr., G. S. Palmer, O.N. 310410 (Dev.); P.O. Mech. (E.) W. E. Palmer, O.N. F.8110; Air Mech., 1st Gr. (E.), B. Percy, O.N. F.7308; Ldg. Mech., J. L. Plumbe, O.N. F.1488; P.O. Mech. G. H. Price, O.N. F.662.

C.P.O. Mech., 3rd Gr. (E.), A. J. Ramsey, O.N. F.13772; C.P.O. Mech., 3rd Gr., H. J. Richer, O.N. F.308; P.O. Mech. N. K. Ruxton, O.N. F.3564.

C.P.O. Mech., 3rd Gr., A. J. Saunders, No. R.M. Ch./A.8603; Air Mech., 1st Gr., A. A. Smith, O.N. 225269 (Po.); C.P.O. Mech., 3rd Gr. (E.), A. S. Stephenson, O.N. F.3398; P.O. Mech. (C.), G. Swindells, O.N. F.8596.

Air Mech., 1st Gr., F. E. Tattershall, O.N. F.8200; P.O. Mech. (E.) T. W. Thirlwall, O.N. F.9430; P.O. Mech. F. T. Tucker, O.N. F.2575.

P.O. Mech. (E.), F. P. Vobe, O.N. F.3901.

P.O. Mech. C. H. Wainwright, O.N. F.2683; C.P.O. Mech., 2nd Gr. (C.), H. Walder, O.N. 344482 (Po.); Ldg. Mech. J. W. Walker, O.N. F.12468; P.O. Mech. H. M. Watson, O.N. J.3349 (Po.); P.O. Mech. J. R. Woolard, O.N. K.15829 (Po.); Air Mech., 2nd Gr., P. L. Worthington, O.N. F.18949; C.P.O. Mech., 2nd Gr., J. Wrigley, O.N. F.469; Actg. Air Mech., 1st Gr., L. H. Wright, O.N. F.4315; C.P.O. Mech., 3rd Gr., J. M. Wyer, O.N. F.43545.

The Distinguished Conduct Medal.

20624 Cpl. M. Mather, R.F.C. (Croy Station).

A Bar to the Distinguished Service Medal.

P.O. Mech. T. B. Thomson, D.S.M., O.N. J.13350 (Dev.).

Mentions in Dispatches.

The following officers and men have been mentioned in Dispatches:—

Wing Capt. H. P. Smyth-Osbourne, R.N.; Wing Comdr. T. R. Cave-Brown-Cave, R.N.

Sqdn. Comdr. J. L. Travers, R.N.A.S.; Sqdn. Comdr. L. Tomkinson, R.N.; Sqdn. Comdr. R. H. Jones, R.N.A.S.; Sqdn. Comdr. R. J. J. Hope-Vere, R.N.A.S.; Sqdn. Comdr. G. H. Scott, R.N.A.S.; Sqdn. Obsr. F. H. Swann, R.N.A.S.; Sqdn. Obsr. G. L. Thomson, D.S.C., R.N.A.S.; Lt.-Comdr. R. B. B. Colmore, R.N. (Flt. Comdr., R.N.A.S.).

Flt. Comdr. (actg. Sqdn. Comdr.) E. J. Hodsoll, R.N.A.S.; Flt. Comdr. B. Travers, R.N.A.S.; Flt. Comdr. M. E. A. Wright, R.N.A.S.; Flt. Comdr. N. C. Blanch, R.N.A.S.; Flt. Comdr. E. S. Cripps, R.N.A.S.; Flt. Comdr. G. H. Jackson, R.N.A.S.; Flt. Comdr. W. K. F. G. Warneford, R.N.A.S.; Flt. Comdr. B. C. Windeler, R.N.A.S.

Flt. Lt. W. H. S. Aplin, R.N.A.S.; Flt. Lt. P. E. Maitland, R.N.; Flt. Lt. C. H. W. Godfrey, R.N.A.S.; Flt. Lt. W. G. Pigott, R.N.; Flt. Lt. G. R. I. Snow, R.N.; Flt. Lt. W. B. Callaway, R.N.; Flt. Lt. J. F. Dixon, D.S.C., R.N.A.S. (killed); Flt. Lt. J. F. Hart, R.N.A.S.; Flt. Lt. D. B. M. Hume, R.N.A.S.; Flt. Lt. L. M. Bailey, R.N.A.S.; Flt. Lt. T. E. B. Howe, R.N.A.S.; Flt. Lt. W. E. C. Parry, R.N.A.S.

Flt. Sub-Lt. G. H. T. Barnes, R.N.A.S.; Flt. Sub-Lt. T. C. Pattinson, R.N.A.S.; Flt. Sub-Lt. E. J. Addis, R.N.A.S.; Flt. Sub-Lt. J. A. E. Vowles, R.N.A.S.; Obsr. Sub-Lt. D. G. McGregor, R.N.A.S.; Flt. Sub-Lt. A. Ward, R.N.A.S.; Flt. Sub-Lt. S. B. Harris, R.N.; Prob. Obsr. Sub-Lt. G. G. Speight, R.N.A.S.

Warrt. Officer, 1st Gr., F. Susans, R.N.A.S.; Warrt. Officer, 2nd Gr., F. E. Bishop, R.N.A.S.; Warrt. Officer, 2nd Gr. R. W. Edwards, R.N.A.S.; Warrt. Officer, 2nd Gr., A. Page, R.N.A.S.; Warrt. Officer, 2nd Gr., F. Wiltshire, R.N.A.S.; Warrt. Officer, 2nd Gr., H. J. Usher, R.N.A.S.; Warrt. Officer, 2nd Gr., W. Wheatley, R.N.A.S.; Warrt. Officer, 2nd Gr., H. Williams, R.N.A.S.; Warrt. Officer, 2nd Gr., L. J. Chandler, R.N.A.S.; Warrt. Officer, 2nd Gr., E. W. Mann, R.N.A.S.

Lt.-Comdr. (actg. Comdr.) L. H. Strain, D.S.C., R.N.V.R.; Lt.-Comdr. A. S. Halliwell, R.N.V.R.; Lt.-Comdr. T. A. Monckton, R.N.V.R.; Lt.-Comdr. G. H. Abell, R.N.V.R.; Lt.-Comdr. A. S. Langley, R.N.V.R.; Lt.-Comdr. A. Partridge, R.N.V.R.; Lt.-Comdr. C. C. Turner, R.N.V.R.; Lt.-Comdr. G. Hazelton, R.N.V.R.

Lt. (actg. Comdr.) G. W. F. Fraser, R.N.V.R.; Lt. (actg. Comdr.) F. Atkinson, R.N.V.R.; Lt. (actg. Lt.-Comdr.) D. A. B. Morle, R.N.V.R.; Lt. V. A. F. Bellamy, R.N.V.R.; Lt. C. Harrison, R.N.V.R.; Lt. J. Robinson, R.N.V.R.; Lt. R. M. S. Veal, R.N.V.R.; Lt. J. K. Wells, R.N.V.R.; Lt. O. C. Williams, R.N.V.R.; Lt. J. Chapman, R.N.V.R.; Lt. W. W. Farthing, R.N.V.R.; Lt. C. K. Jupp, R.N.V.R.; Lt. F. Smith, R.N.V.R.; Lt. R. Spickernell, R.N.V.R.; Lt. W. Young, R.N.V.R.

Sub-Lt. C. R. E. Pope, R.N.V.R.; Sub-Lt. E. K. Wells, R.N.V.R.

Ldg. Mech. T. Adam, O.N. F.10687; Ldg. Mech. (E.) A. E. Allard, O.N. F.13318; Ldg. Mech. T. B. Arlette, O.N. F.19966; C.P.O. Mech., 3rd Gr., C. Armitage, O.N. F.6981; Ldg. Mech. J. A. Askew, O.N. F.28288.

C.P.O. Mech., 3rd Gr., B. A. Bagnall, O.N. F.345; Actg. Air Mech., 1st Gr., W. Baker, O.N. F.11681; P.O. Mech. W. J. Bartle, O.N. F.7053; Air Mech., 1st Gr., W. H. Barton, O.N. F.12834; M.A.A. H. C. Beeton, O.N. 167555 (Ch.); P.O. Mech. (E.) R. Bellian, O.N. F.1082; Ldg. Mech. (E.) W. A. Betteley, O.N. F.8387; C.P.O. Mech., 3rd Gr. (E.), J. B. Bishop, O.N. F.4277; Ldg. A.C. H. W. Bompas, O.N. F.14638; Ldg. Sea. S. Boucher, R.N.V.R., O.N. A.A.1209; P.O. Mech. (E.) F. E. Bowden, O.N. F.12163; C.P.O. Mech. 3rd Gr. (E.), O. C. Bown, O.N. F.2661; Ldg. Mech. S. Bremner, O.N. F.6884; C.P.O. Mech., 3rd Gr., E. J. Bristow, O.N. F.7180.

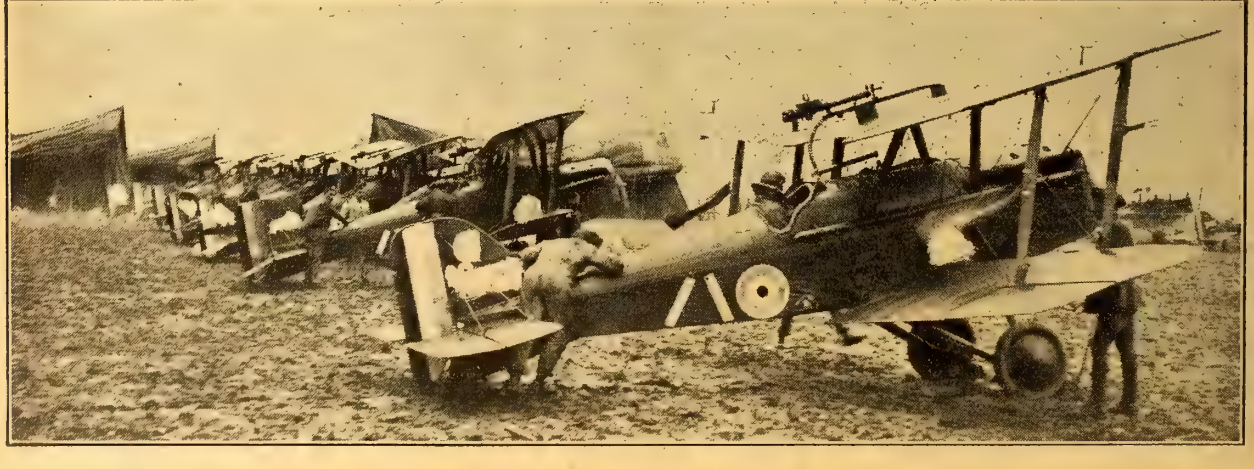
C.P.O. Mech., 3rd Gr., N.S. Calder, O.N. F.3641; Air Mech., 1st Gr. (E.), C. Calver, O.N. F.18438; P.O. Mech. (C.) A. G. Carr, O.N. F.9778; Actg. Air Mech., 1st Gr. (E.), W. G Chapman, O.N. F.24573; Air Mech., 1st Gr., W. L. Clark, O.N. F.3947; C.P.O. Mech., 3rd Gr., W. Clayton, O.N. F.673; P.O. Mech. E. A. Coates, O.N. 237750 (Dev.); Air Mech., 2nd Gr., J. Collett (killed), O.N. F.20396; P.O. Mech. W. L. Collyer, O.N. F.894; P.O., 1st Cl., G. A. Constable, O.N. L.8855; Ldg. Mech. T. G. Cook, O.N. F.19710; Ldg. Mech. J. Cooper, O.N. F.3726; C.P.O. Mech., 2nd Gr., A. E. Crespin, O.N. F.7719; Air Mech., 1st Gr., H. F. Crespin, O.N. F.2403; Ldg. Mech. H. W. Crisp, O.N. F.266; Ldg. Mech. C. A. Cross, O.N. F.2066; Air Mech., 1st Gr. (E.), A. H. Cuff, O.N. F.3671; C.P.O. Mech., 2nd Gr., A. H. Cummings, O.N. F.667.

Air Mech., 2nd Gr., A. M. Daniels, O.N. F.13488; P.O. Mech. A. W. Deed, O.N. F.2108; Air Mech., 1st Gr. (C.), C. W. Deuchar, O.N. F.8808; C.P.O. Mech. T. A. Dimon, O.N. 170694 (Dev.); P.O. Mech. L. Doyle, O.N. 15210 (Dev.); Ldg Mech. R. Duckett, O.N. F.12458.

C.P.O. Mech., 2nd Gr. (E.), F. G. Eckford, O.N. F.217; Ldg. Mech. (E.) F. J. Emerson, O.N. F.1057.

Ldg. Draughtsman T. W. Feasey, O.N. F.13026; C.P.O Mech., 3rd Gr., C. Folley, O.N. F.9512; Act. Air Mech., 1st Gr., R. Ford, O.N. F.5780; P.O. Mech. (E.) S. T. Fowler, O.N. F.4655; Ldg. A. C. W. Franklin, O.N. F.17143; C.P.O. Mech., 3rd Gr., W. D. Frost, O.N., F.3907; Air Mech., 1st Gr., G. H. Frost, O.N. F.7656.

P.O. Mech. (E.) E. J. Garner, O.N. F.378; C.P.O. Mech., 2nd Gr., W. S. Gilbert, O.N. F.9102; Ldg. Mech. (C.) H. E. Goodrick, O.N. F.7778; Air Mech., 1st Gr. (E.), F. Grant, O.N.



An Official Photograph taken on the British Western Front in France.

Telephone:—
OFFICE ... 912 REGENT.
WORKS ... 4762 KENSINGTON.
281-2-3 WEMBLEY.

Telegrams:—
"SOCIABLE, PHONE, LONDON."

HOOPER & CO. LTD.

AEROPLANE BUILDERS TO H.M. AIR COUNCIL.

MOTOR-BODY BUILDERS

TO



BY ROYAL WARRANT.



BY ROYAL WARRANT.



BY ROYAL WARRANT.

HIS MAJESTY THE KING.
HER MAJESTY THE QUEEN.
HER MAJESTY QUEEN ALEXANDRA.
H.I.M. MARIE DOWAGER EMPRESS OF RUSSIA.
H.R.H. THE DUKE OF CONNAUGHT.

HOOPER & CO. are also Coachbuilders to

H.M. The King of Spain.
H.M. The King of Norway.
H.M. The Queen Mother of the Netherlands
H.R.H. The Princess Royal.
H.R.H. Princess Louise, Duchess of Argyll.
H.R.H. Princess Victoria.

54, St. James's Street,
PICCADILLY, LONDON, S.W.1.

F.11338; P.O. Mech. J. McL. Gray, O.N. F.18460; Ldg. Mech. W. J. Gulliver, O.N. F.2947.

P.O. Mech. (C.) C. G. Hine, O.N. F.10996.

C.P.O. Mech., 3rd Gr. (E.), W. F. Inns, O.N. M.14393 (Ch.).

P.O. Mech. W. D. Jones, O.N. F.10549.

P.O. Mech. (C.) G. F. Kemp, O.N. F.12612; C.P.O. Mech., 2nd Gr., A. H. Knight, O.N. 202087 (Ch.); Ch. Ship's Cook A. H. Knight O.N. 247120 (Ch.); C.P.O. Mech., 3rd Gr., A. Knowles, O.N. F.3359.

Ldg. Mech. (E.) A. C. Lane, O.N. F.5595; Ldg. Mech. W. G. Lavender, O.N. F.11477; Actg. Air Mech., 1st Gr., H. Leadbetter, O.N. J.3300 (Dev.); Ldg. Mech. C. J. Lofts, O.N. F.6430; C.P.O. Mech., 3rd Gr., C. A. Longhurst, O.N. F.5521.

Ldg. Mech. J. H. Manser, O.N. F.29004; P.O. Mech. R. J. Marfleet, O.N. F.12604; C.P.O. J. Marra, O.N. 104578 (R.F.R.Po./A1268); Actg. Air Mech., 1st Gr., J. E. Martin (killed), O.N. J.34195 (Po.); P.O. Mech. (E.) E. W. Martin, O.N. F.319; A.B. J. W. Miller, O.N. 226447 (Ch.); Actg. Ldg. Mech. L. C. Moss, O.N. F.907; C.P.O. Mech., 2nd Gr., H. G. Mugridge, O.N. G.11854 (Ch.); Ldg. Mech. J. A. V. Murfin, O.N. F.18271.

Ldg. Mech. H. Neville, O.N. F.8215; Air Mech., 1st Gr. (E.) M. Nunn, O.N. F.742.

C.P.O. E. S. Oak-Rhind, R.N.V.R., O.N. A.A.1415.

C.P.O. Mech., 3rd Gr., E. C. Parker, O.N. F.3331; Ldg. Mech. W. H. Pascoe, O.N. F.5141; Actg. Air Mech., 1st Gr., F. F. Petersen, O.N. F.10567; C.P.O. Mech, 3rd Gr., H. L. Pitt, O.N. F.145; C.P.O. Mech., 1st Gr., R. J. M. Platt, D.S.M., O.N. F.393; P.O. Mech. G. E. Plumpton, O.N. F.18405; C.P.O. Mech., 3rd Gr., T. W. Point, O.N. F.5636.

Air Mech. 1st Gr., P. A. Reeves, O.N. F.3895; C.P.O. Mech., 3rd Gr. (E.), F. P. Revie, O.N. F.5402; Ldg. Mech. A. E. Rosevear, O.N. F.5052; Ldg. Mech. W. S. Russell, O.N. F.18854; Actg. P. O. Mech. S. E. O. Russell, O.N. F.10609.

Ldg. Mech. (E.) J. B. Sanders, O.N. F.9657; Ldg. Mech. L. F. Short, O.N. F.8173; P.O. Mech (C.) F. J. Smart, O.N. F.19780; P.O. Mech. (E.) S. J. Smith, O.N. F.330; P.O. Mech. J. Smith, O.N. F.3735; P.O. Mech. (C.) H. W. Smith, O.N. F.11213; P.O. Mech. H. B. Smith, O.N. F.14607; Ldg. Mech. F. N. Squire, O.N. F.9397; P.O. Mech. (C.) W. J. Squire, O.N. F.4309; P.O. Mech. (E.) S. Stilwell, O.N. F.210; P.O. Mech. (E.) C. Stimpson, O.N. F.3344.

C.P.O. Mech., 2nd Gr. (E.) H. Tatem, O.N. F.253; Ldg. Mech. E. S. Temperton, O.N. F.13564; C.P.O. Mech., 3rd Gr., J. Thomas, O.N. F.307; Actg. Air Mech., 1st Gr. (E.) F. Thompson, O.N. F.8907; Ldg. Mech. F. Thorn, O.N. 228367 (Ch.); Air Mech., 1st Gr., P. J. L. Tigg, O.N. F.24996; P.O. Mech. F. J. Tucker, O.N. F.7733.

C.P.O. Mech., 2nd Gr. (E.) S. Upton, O.N. M.3933 (Ch.).

C.P.O. Mech., 3rd Gr., J. G. W. Wicks, O.N. F.8128; Ldg. Mech. A. W. Whistlecraft, O.N. F.4972; P.O. Mech., 1st Gr. (E.) E. R. Whyte (killed), O.N. F.2824; C.P.O., 3rd Gr. (E.), M. W. Winterbottom, O.N. F.689; Ship's Std. R. J. Wyatt, O.N. 341,138 (Ch.).

NOTE.—The ranks and ratings of officers and men given above are those which they held on Dec. 31st, 1917.

WAR OFFICE, May 1st.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING.—Gen.List.—G. F. Whitmore, late temp. Maj., to be temp. Maj., Nov. 19th, 1917.

* * *

The King has been pleased to award the Distinguished Conduct Medal to the following for gallantry and distinguished service in the Field:—

21479 1st Cl. Air Mech. S. W. EGAN, R.F.C. (Catford, S.E.)

CORRIGENDUM.—The following name should read as now stated and not as previously published:—King, Lt. W. J., N. Staff. R. and R.F.C.

AIR MINISTRY, May 1st.

The King has been pleased to award the Victoria Cross to the following Officers of the R.A.F., for services displaying outstanding bravery:—

Lt. ALAN JERRARD, R.A.F. (formerly of the S. Staff. R.).

When on an offensive patrol with two other officers he attacked five enemy aeroplanes and shot one down in flames, following it down to within 100 ft. of the ground.

He then attacked an enemy aerodrome from a height of only 50 ft. from the ground, and, engaging single-handed some 19 machines, which were either landing or attempting to take off, succeeded in destroying one of them, which crashed on the aerodrome. A large number of machines then attacked him, and whilst thus fully occupied he observed that one of the pilots of his patrol was in difficulties. He went immediately to his assistance, regardless of his own personal safety, and destroyed a third enemy machine.

Fresh enemy aeroplanes continued to rise from the aerodrome, which he attacked one after another, and only retreated, still engaged with five enemy machines, when ordered to do so by his patrol leader. Although apparently wounded, this very gallant officer turned repeatedly, and attacked single-handed the pursuing machines, until he was eventually overwhelmed by numbers and driven to the ground.

Lt. Jerrard had greatly distinguished himself on four previous occasions, within a period of 23 days, in destroying enemy machines, displaying bravery and ability of the very highest order.

Sec. Lt. ALAN ARNETT MCLEOD, R.A.F.

Whilst flying with his observer (Lt. A. W. Hammond, M.C.), attacking hostile formations by bombs and machine-gun fire, he was assailed at a height of 5,000 ft. by eight enemy triplanes, which dived at him from all directions, firing from their front guns. By skilful manœuvring he enabled his observer to fire bursts at each machine in turn, shooting three of them down out of control. By this time Lt. McLeod had received five wounds, and whilst continuing the engagement a bullet penetrated his petrol tank and set the machine on fire.

He then climbed out on to the left bottom plane, controlling his machine from the side of the fuselage, and by side-slipping steeply kept the flames to one side, thus enabling the observer to continue firing until the ground was reached.

The observer had been wounded six times when the machine crashed in "No Man's Land," and Sec. Lt. McLeod, notwithstanding his own wounds, dragged him away from the burning wreckage at great personal risk from heavy machine-gun fire from the enemy's lines. This very gallant pilot was again wounded by a bomb whilst engaged in this act of rescue, but he persevered until he had placed Lt. Hammond in comparative safety before falling himself from exhaustion and loss of blood.

WAR OFFICE, May 2nd.

REGULAR FORCES.—ESTABLISHMENTS.—R.F.C.—MIL. WING.—Sqdn. Comdr.—Lt. (temp. Capt.) J. McKelvie, R.E., T.F., from a Flt. Comdr., and to be temp. Maj. while so empld., March 11th.

Flt. Comdr.—Lt. T. P. Middleton, R.F.A., T.F., from a Flying Officer, and to be temp. Capt. while so empld., March 30th.

Park Comdrs.—From Equipt. Officers, 1st Cl., and to be temp. Majs. whilst so empld.:—Lt. (temp. Capt.) J. E. Rendle, Spec. Res., Feb. 15th; Lt. (temp. Capt.) H. R. Lecomber, Spec. Res., Feb. 28th; Sec. Lt. (temp. Capt.) L. Auker, Gen. List, March 9th; Lt. (temp. Capt.) G. Somers-Clarke, Spec. Res., March 31st.

Gen. List.—Actg. Cpl. D. S. Nicol, from R.F.C., to be temp. Sec. Lt., Feb. 25th.

WAR OFFICE, May 3rd.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING.—Asst. Instr. in Gunnery (graded as an Equipt. Officer, 2nd Cl.)—Lt. R. R. MacGregor, R. Scots, T.F., from M.G. Corps, Sept. 18th, 1918.

Experimental Officer, 3rd Cl.—Graded as an Equipt. Officer, 3rd Cl.—Temp. Sec. Lt. (on prob.) A. Spring, Gen. List, and to be confirmed in his rank, Feb. 20th.

SCHOOLS OF INSTRN.—SCHOOLS OF MIL. AERONAUTICS.—Instr. in Gunnery.—Graded as an Equipt. Officer, 1st Cl.—Temp. Lt. R. C. Nicholls, Gen. List, from an Asst. Instr. in Gunnery (graded as an Equipt. Officer, 2nd Cl.), and to be temp. Capt. while so empld., Feb. 1st.

Gen. List.—Lt. R. R. MacGregor, R. Scots, T.F., to be temp. Capt. while specially empld., Dec. 10th, 1917.

To be temp. Sec. Lts.—3rd Cl. Air Mech. R. Musgrave, from R.F.C.; 3rd Cl. Air Mech. J. E. Atkinson, from R.F.C., Jan. 4th; 3rd Cl. Air Mech. R. Sykes, from R.F.C.; Flt. Serjt. H. H. Wright, from R.F.C., Feb. 2nd.

AIR MINISTRY, May 3rd.

R.A.F.—The follg. temp. appts. are made at the Air Ministry:

Deputy Controller-General of Equipt.—A. Huggins, D.S.O. (Bt. Maj. in Army), is transfd. to R.A.F., and is granted a temp. commn. as Lt.-Col., and to be temp. Brig.-Gen. while so empld., Feb. 18th (substituted for notification in "Gazette" of March 22nd).

Staff Officer, 2nd Cl.—Lt. (temp. Capt.) L. Reynolds, and to be temp. Maj. while so empld., April 3rd.

Staff Officer, 3rd Cl. (unpaid).—Temp. Hon. Capt. B. S. Cohen, April 1st (substituted for notification in "Gazette" of April 2nd.

The follg. temp. appts. are made:—

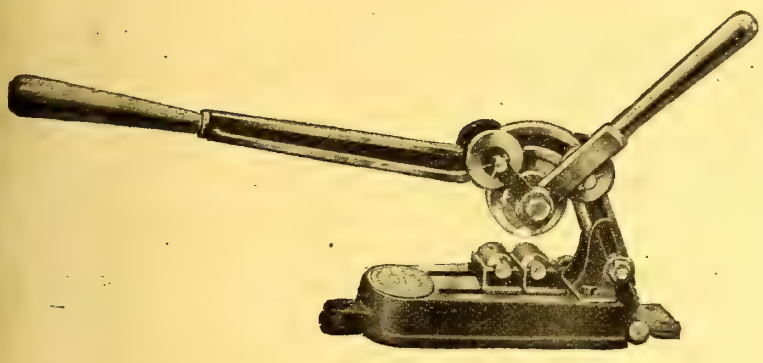
Area Comdrs.—Maj.-Gen. M. E. F. Kerr, C.B., M.V.O.; F. C. Heath-Caldwell, C.B. (Maj.-Gen. in Army), and is granted a temp. commn. as Maj.-Gen.; Hon. Sir F. Gordon, K.C.B., D.S.O. (Maj.-Gen. in Army), and is granted a temp. commn. as Maj.-Gen.; G. C. Cayley, C.B. (Rear-Adm. in R.N.), and is granted a temp. commn. as Maj.-Gen.; Lt.-Col. (temp. Maj.-Gen.) C. A. H. Longcroft, D.S.O., and to retain his temp. rank while so empld., April 1st.

Brig. Comdr.—Lt.-Col. (temp. Brig.-Gen. in Army) T. C. R. Higgins, April 1st.

Group Comdrs. (and to be temp. Brig.-Gens. while so empld. if not already holding that rank).—Lt.-Col. (temp. Brig.-Gen. in Army) J. H. W. Becke, D.S.O., Lt.-Col. (temp. Brig.-Gen.) H. D. Priggs, Lt.-Col. E. L. Gerrard, Lt.-Col. (temp. Brig.-Gen.) C. L. Lambe, C.M.G., D.S.O., Lt.-Col. H. P. Smyth-Osbourne, Lt.-Col. J. M. Steel, Lt.-Col. (temp. Brig.-Gen. in

E.103.

Another BLACKBURN Idea



for better and quicker work—

THE BLACKBURN PATENT

MARKING MACHINE

Stamp your identification or trade mark, on all the work you turn out, with the Blackburn Marking Machine. It is strongly built, will hold four dies which are of standard size and interchangeable. The Blackburn Marker is indispensable in your inspection department, being more convenient and handier than the old kinds of markers and in every way a superior machine. With a Blackburn Marker you can stamp any kind of metal—*e.g.*, tubes, bolts, pins, turnbuckles, fork-ends, etc.—which could not be marked in the ordinary way.



Variety of Shapes and Parts suitable for Stamping with the Blackburn Marker.

Price and further particulars on application direct to:

THE PROPRIETORS,

BLACKBURN AIRCRAFT PRODUCTS,

30, Norfolk Street, London, W.C.2.

Blackburn AIRCRAFT

Steele's Ad. Serv.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Army) C. F. de S. Murphy, D.S.O., M.C., April 1st. Lt.-Col. W. B. Caddell, April 20th. Lt.-Col. F. V. Holt, D.S.O., April 26th.

Group Comdrs. (and to be temp. Cols. whilst so empld., if not already holding that rank).—Maj. (temp. Lt.-Col.) A. W. Bigsworth, D.S.O., Lt.-Col. A. G. Board, D.S.O., Lt.-Col. E. F. Briggs, D.S.O., Lt.-Col. (temp. Col.) C. R. Samson, D.S.O., Lt.-Col. S. E. Smith, April 1st. Lt.-Col. W. R. Freeman, D.S.O., M.C. April 22nd. (And to be temp. Lt.-Cols. whilst so empld. if not already holding that rank).—Maj. R. C. Hayes, Lt.-Col. H. A. Williamson, April 1st.

2nd in Comd. of a Group.—Lt.-Col. F. C. Halahan, and to be temp. Col. whilst so empld, April 1st.

Brig.-Gens. (Admin.) (and to be temp. Brig.-Gens., whilst so empld.).—B. H. H. Cooke, C.M.G., D.S.O., (Lt.-Col. in Army), and is granted a temp. commn. as Lt.-Col.; Lt.-Col. (temp. Brig.-Gen. in Army), H. C. T. Dowding, April 1st.

Cols. (Admin.) (and to be temp. Cols. while so empld.).—Maj. (temp. Lt.-Col.) B. C. Fellows, Maj. (temp. Lt.-Col.) A. L. Godman, D.S.O., April 1st. Maj. (temp. Lt.-Col.) N. D. K. MacEwen, D.S.O., April 20th.

S.O., 1st Cl. (and to be temp. Lt.-Cols. while so empld. if not already holding that rank).—A. M. Bent, C.M.G. (Bt. Col. in Army), and is granted a temp. commn. as Lt.-Col. (Hon. Col.); Capt. H. M. Bentley; Lt.-Col. I. M. Bonham Carter; K. L. Buist (Maj. in Army), and is granted a temp. commn. as Maj.; Capt. M. G. B. Copeman; Capt. E. R. L. Corballis, D.S.O.; Maj. A. H. W. Elias Wynn; Maj. (temp. Lt.-Col.) N. J. Gill, M.C.; E. H. Griffith (Maj., Bt. Lt.-Col., ret. pay), and is granted a temp. commn. as Lt.-Col.; Maj. T. G. Hetherington, C.B.E.; Maj. (temp. Lt.-Col.) L. Jenkins, D.S.O., M.C.; C. E. Lawder (temp. Maj. in Army), and is granted a temp. commn. as Maj.; Maj. A. Levick; Maj. C. M. Murphy; Maj. F. L. Scholts, April 1st. Maj. C. R. S. Bradley, April 2nd. L. Munro (Col., ret. pay), and is granted a temp. commn. as Lt.-Col. (Hon. Col.), April 4th. Capt. (temp. Maj.) F. A. J. B. Wisemen, April 6th. J. A. Houlson-Craufurd (Maj., ret. pay), and is granted a temp. commn. as Maj.; A. C. Winter (actg. Staff Paymaster, R.N.), and is granted a temp. commn. as Maj., April 10th. J. M. Home (Bt. Col. in Army), and is granted a temp. commn. as Lt.-Col. (Hon. Col.), April 11th. E. P. A. Melville (Capt. in Army), and is granted a temp. commn. as Capt., April 15th.

S.O., 2nd Cl. (and to be temp. Majs. while so empld. if not already holding that rank).—Lt. (Hon. Capt.) S. C. F. Bacon; Lt. (temp. Capt.) C. H. Bell; Capt. W. T. Blake; H. Campbell, D.S.O. (Lt.-Col. in Army, T.F.), and is granted a temp. commn. as Maj. (Hon. Lt.-Col.); C. T. Hesketh (Hon. Maj. in Army), and is granted a temp. commn. as Capt.; Capt. P. Sidney; Lt. A. E. Loder (Staff Paymr., R.N.R.), and is granted a temp. commn. as Maj.; Capt. A. W. MacIlwaine; Capt. (Hon. Maj.) H. A. Mitchell; Capt. E. C. Perrin; C. A. Shaw (Capt. in Army), and is granted a temp. commn. as Capt.; Capt. P. Sidney; Lt. (temp. Capt.) G. A. Sinclair-Hill; Lt. (actg. Capt.) R. W. Ward; M. McK. Wood (Capt. in Army, T.F.), and is granted a temp. commn. as Capt., April 1st. Lt. H. K. Payne, April 6th. Capt. C. F. O. Master, April 8th. H. F. F. Birch (temp. Capt. in Army), and is granted a temp. commn. as Capt., April 10th. Sec. Lt. E. W. Simpson, April 13th.

S.O., 3rd Cl. (and to be temp. Capts. while so empld. if not already holding that rank).—Lt. (Hon. Capt.) J. Andrews, Lt. (Hon. Capt.) J. M. Bell, D. L. Blumenfeld (Lt. in Army, T.F.), and is granted a temp. commn. as Lt., Capt. W. D. Budgen, Lt. H. W. Eaton, Lt. (Hon. Capt.) P. Ellis, Lt. (Hon. Capt.) R. R. Prentice, J. L. Robertson (Capt. in Army), and is granted a temp. commn. as Capt. Lt. S. T. Smith, Capt. B. D. S. Tuke (April 1st); Lt. (temp. Capt.) R. L. Kennedy (April 8th); Capt. F. J. Wise (April 9th); Lt. Hon. Capt. J. A. Carr, D.S.C. (April 10th); Lt. G. R. McCubbin, D.S.O. (April 11th); Lt. (temp. Capt.) E. J. Wickens (April 23rd).

E. L. Ellington, C.M.G. (Bt. Col. (temp. Brig.-Gen.) in Army), is granted a temp. commn. as Col., and to be temp. Maj.-Gen. while specially empld. (April 10th).

Col. F. R. Scarlett, D.S.O., to be temp. Brig.-Gen. while empld. as Dir., Air Division, at the Admiralty (April 1st).

Col. (temp. Brig.-Gen.) A. V. Vyvyan, D.S.O., to retain his temp. rank while seny. R.A.F. Officer under the Commander-in-Chief, Mediterranean (April 17th).

Flying Branch.—Maj. A. V. Holt to be temp, Lt.-Col. while empld. as Lt.-Col. (Flying) (April 21st).

Capt. K. F. Balmain to be temp Maj. while empld. as Maj. (Flying) (April 21st).

Lt. G. C. Twining to be temp. Capt. (but without the pay and allowances of that rank) while specially empld. (April 1st).

Lts. to be temp. Capts. while empld. as Capts. (Flying).—(Hon. Capt.) F. Lindsay, I. H. P. McEwen (April 1st); F. A. Nicholson (April 3rd); D. G. Cooke (April 11th); G. O. Johnson (April 12th); (Hon. Capt. S. W. Vickers (April 19th); J. V. Sorsoleil, M.C. April 20th); H. C. R. Owen (April 21st); G. G. Walker (April 26th).

The following are granted temp. commns. as Sec. Lts.—Serjt. (Pilot) H. N. Lee, Serjt. (Pilot) C. L. Startup (April 29th).

Lt. W. J. G. Armiger relinquishes his commn. on account of ill-health contracted on active service (May 4th).

Lt. (Lt. Can. Local Forces) H. K. Black relinquishes his commn. on ceasing to be empld. on acct. of ill-health (May 4th).

Lt. (Lt., S. Staffs, Spec. Res.) F. P. Blencowe relinquishes his commn. on ceasing to be empld. on acct. of ill-health contracted on active service (May 4th).

Lt. (Lt. Can. Local Forces) W. W. Boyd relinquishes his commn. on ceasing to be empld. (May 4th).

Lt. D. W. Dawson resigns his commn. to resume his medical studies (May 4th).

Lt. W. T. Grieves resigns his commn. (May 4th).

Lt. R. K. MacKenzie resigns his commn. (May 4th).

Lt. C. P. Vivian relinquishes his commn. on acct. of ill-health contracted on active service (May 4th).

Sec. Lt. B. St. J. H. Atteridge relinquishes his commn. on acct. of ill-health contracted on active service (May 4th).

Sec. Lt. M. Benjamin relinquishes his commn. on acct. of ill-health (May 4th).

The notification in the "Gazette" of April 19th concerning Maj. (temp. Lt.-Col.) R. R. Smith-Barry is cancelled.

Administrative Branch.—W. B. Armitage (temp. Maj. in Army) to be Capt. (Hon. Maj.) (April 13th).

H. Perry (temp. Capt. in Army) is granted a temp. commn. as Maj. (April 15th).

Capt. J. L. Luntley relinquishes the temp. rank of Maj. on reversion to Admin. Capt. (April 26th).

Lt. B. D. Bellamy, from a Staff Officer 4th Cl., to be Admin. Lt. (April 26th).

Capt. (temp. Maj.) Hon. M. Baring, from a Staff Officer, 2nd Cl., to retain his temp. rank while empld. as Admin. Maj. (April 27th).

Sec. Lt. G. Ryall to be temp. Lt. while empld as Admin. Lt. (April 29th).

J. H. Wright (temp. Lt. in Army) to be temp. Sec. Lt. while empld. as Admin. Sec. Lt. (April 29th).

G. H. Carbutt (Midshipman, R.N.) is granted a temp. commn. as Sec. Lt. (April 1st).

Cadets are granted temp. commns. as Sec. Lts.—E. J. A. Prosser, C. E. Taylor, W. Waddingham (April 3rd); R. L. Burdon-Sanderson (April 6th); C. H. Allen, E. S. Bale, H. C. S. Drake, J. S. Houston, W. C. Ingleby, A. A. Jackson, L. W. Killeen, L. T. Lawrence, H. W. T. Lewis, R. G. Maclean, J. McCormack, E. P. Nickless, J. L. Ure, W. E. G. Wallace, G. Wayman, A. L. Wright (April 8th); F. Mycock, from A.O.C., Serjt. H. F. Tattersall (April 9th); T. D. H. Bruce (April 14th).

Cadets are granted temp. commns. as Sec. Lts.—K. R. Bennie, W. R. H. Gateshill, H. D. Giblett, W. G. Hines, H. G. Johnston, C. G. Martin, J. T. McDougall, A. L. Muir, 1/A.M. (A./Cpl.) E. S. Osborn, H. Plackett, G. R. Robinson, C. J. Sear, G. C. Shakespeare, W. G. Smith, K. M. Stewart, K. L. Vernon, S. T. Westcott (April 15th); 1/A.M. F. J. Horman-Fisher (April 20th); Ldg. A./C. B. U. Wood (April 23rd); D. L. C. Evans, A. J. Maguire, H. Varney, Aircraftsman R. O. Cook, Ldg. A./C. A. B. Goodman, 1st A/C. C. C. Ham, 3rd Writer T. F. Kingston, Cadet F. B. Morris (April 24th); Cpl. W. T. Bodger (April 28th); 2/A.M. A. R. Deacon, Cpl. C. J. Skidmore-Jones (April 29th); Cadet A. M. Falconer (May 1st).

Technical Branch.—Lt. (temp. Capt.) W. W. Stenning to be temp. Maj. while empld. as (Tech.) Maj. (April 24th).

J. G. Connell (Lt. in Army, T.F.) is granted a temp. commn. as Lt. (April 15th).

Sec. Lt. A. G. Cardwell to be temp. Lt. while empld. as Lt. (Tech.) (April 13th).

J. N. Longfield (temp. Lt. in Army) to be temp. Lt. while empld. as Lt. (Tech.) (April 15th).

Sec. Lt. E. B. Crampton relinquishes his commn. on account of ill-health (May 4th).

Medical Branch.—R. P. Williams, from temp. Capt., R.A.M.C., is granted a temp. commn. as Capt. (April 22nd).

War Office, May 4th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers.—Lt. R. D. Baker, Canadian Local Force, and to be temp. Capt. while so empld., March 1st.

Capt. J. W. Pain, Suff. R., T.F., March 29th.

Adjt.—Capt. C. P. L. Firth, Worc. R., Spec. Res., and to be secd., Jan. 1st.

Gen. List.—The follg. to be temp. Sec. Lts:—Cpl. D. W. Lang, from S. Afr. F.C.; Cpl. W. Hornby, from S. Afr. F.C.; 3rd Cl. Air Mech. G. H. Kernick, from R.F.C.; 3rd Cl. Air Mech. H. V. Evans, from R.F.C.; 2nd Cl. Air Mech. R. S. Brophy, from S. Afr. F.C.; 2nd Cl. Air Mech. A. V. Bickley, from S. Afr. F.C.; 2nd Cl. Air Mech. A. D. Hegan, from R.F.C., Feb. 11th; 3rd Cl. Air Mech. R. H. Bond, from R.F.C., Feb. 12th; Actg. Cpl. R. Lane, from R.F.C.

Memoranda.—R. J. Bray to be temp. hon. Capt. whilst empld. as Inspr. Aeronautical Prodn. Dept., March 20th. Flt. Serjt. M. W. Piercey, from R.F.C., to be Sec. Lt. for service with R.F.C., March 27th.

(*Continued on page 1743.*)

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines
like
Rolls-Royce Cars
are the
Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge Motor Factory
WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

THE FRIEDRICHSHAFEN BOMBING BIPLANE.

A Report issued by the Technical Department of the Department of Aircraft Production, Ministry of Munitions.

This machine, which bears the mark F.D.H. G.3. 326/17, was brought down by anti-aircraft fire at Isbergues on the night of February 16th. A shell made a direct hit on the right-hand engine at a height of 8,000 to 9,000 feet, after which the machine covered about six miles and made a fairly good landing.

Various parts of the structure bear different dates, that on the tail being 14/1/18. The main spars are branded with a small crown and the letters Z.A.K. The following is painted on the side of the body :—

Leergewicht (weight empty), 2,695 kilogrammes = 5,929 lbs.
Nutzlast (useful load), 1,235 kilogrammes = 2,717 lbs.
Zulassiges Gesamtgewicht (permissible total weight), 3,930 kilogrammes = 8,646 lbs.

Crew.

This machine carried its full complement of four persons, namely, pilot, fore-gunner, after-gunner, and bomber. It is known, however, that the number of crew varies considerably, as some machines of this type have only carried two persons. The accommodation is so arranged that the personnel can easily change places, all the cockpits being intercommunicating.

General Description.

The general design of the machine is shown in the attached drawing, which gives plan and front and side elevations.

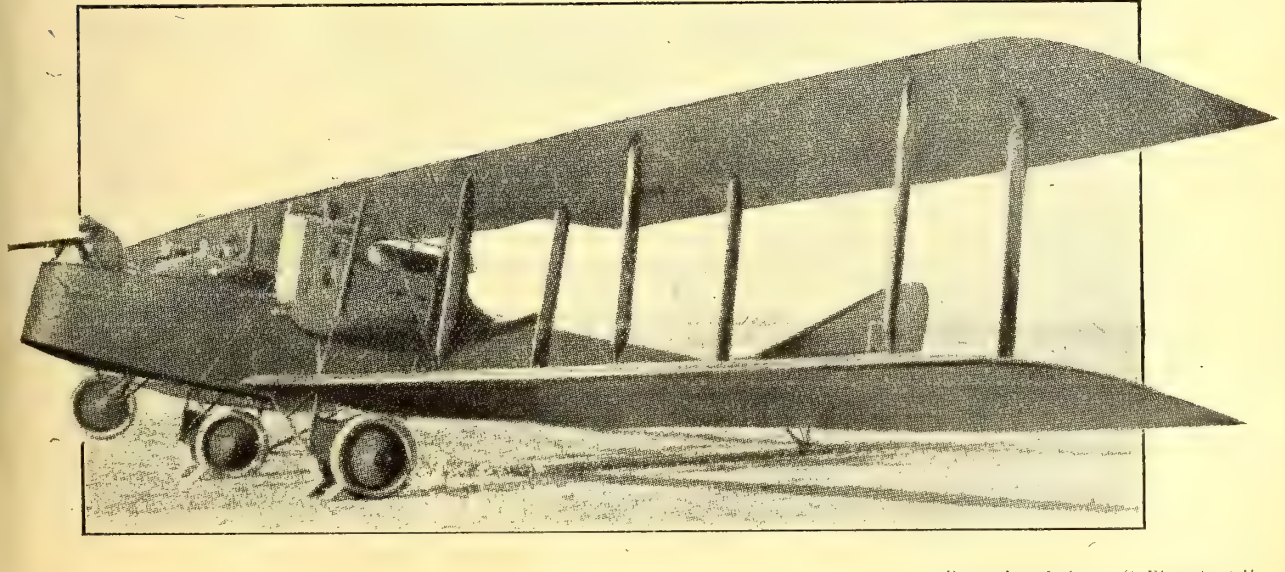
The principal dimensions are as follows :—

Span	78 ft.
Maximum chord	7 ft. 8 in
Gap	7ft.
Dihedral angle in the vertical plane	$1\frac{1}{2}^{\circ}$
Dihedral angle in the horizontal plane	6°
Total area of main planes	934.4 sq ft.
Area of upper main planes without flap	480 ,,
Area of lower main planes without flap	454.4 ,,
Load per square foot	9.24 lbs
Weight per horse power	16.6 lbs
Area of flap of upper wing	21.6 sq. ft.
Balance area	1.8 ,,
Area of flap on lower wing	16 ,,
Balance area	1.56 ,,
Total area of fixed tail planes	57.6 ,,
Total area of elevators	32 ,,
Balance area of one elevator	1.7 ,,
Area of fin	20 ,,
Area of rudder	19.2 ,,
Balance area of rudder	3 ,,
Maximum cross section of body	19.2 ,,
Horizontal area of body	133 ,,
Vertical area of body	131.2 ,,
Length overall	42 ft.

The machine is built up upon a central section, to which are attached the forward and rearward portions of the fuselage and the main planes. This central section comprises the main cell or cabin of the body, containing the tanks, bombs, etc. It also embraces the engines and the central portion of the upper and lower planes. The latter, together with the engine struts, are largely built up of steel tube, as is also the landing gear.

The central portion of the body, which measures 4ft. across by 4ft. 3in. in height, consists of a box formation made of ply wood, strengthened by longerons and diagonals, and transversely stiffened by ply-wood bulkheads. The bulkhead farthest forward acts as an instrument board, behind which are side by side the seats of the pilot and his assistant. The former has a fixed upholstered seat, whilst that of the latter is folding, consisting of a light steel tubular framework with a webbing backrest.

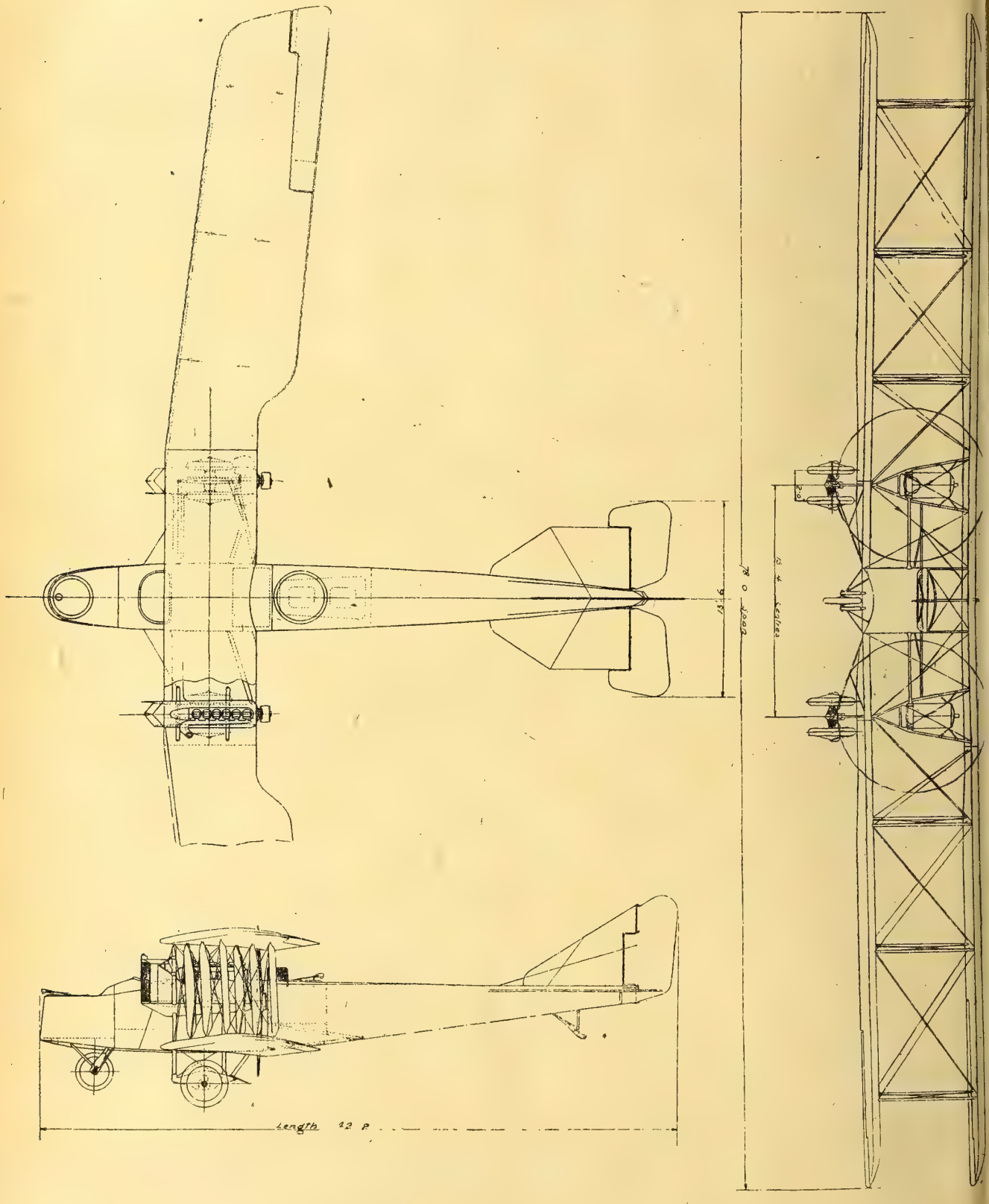
Underneath these two seats is the lower main petrol tank. Behind this cockpit the body is roofed in with ply wood, the rear part of which roofing is detachable so as to give access to the second main petrol tank, which is at the rear end of the main body section. By this means a small cabin or covered



Reproduced from "Flugsport."

A Friedrichshafen twin-engined bomber.

Plan, Front and Side Elevations of the Friedrichshafen Bomber.



From Drawing by the Technical Department of the Directorate of Aircraft Production, of the Air Ministry.

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Works: Blackhorse Lane, Walthamstow.

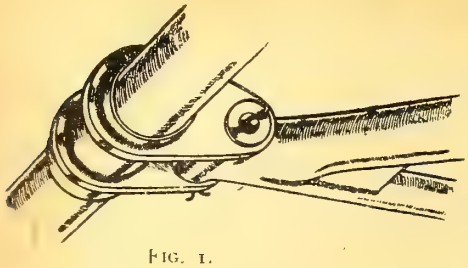


Fig. 1.



Fig. 2.



Fig. 4.



Fig. 3.



Fig 5.

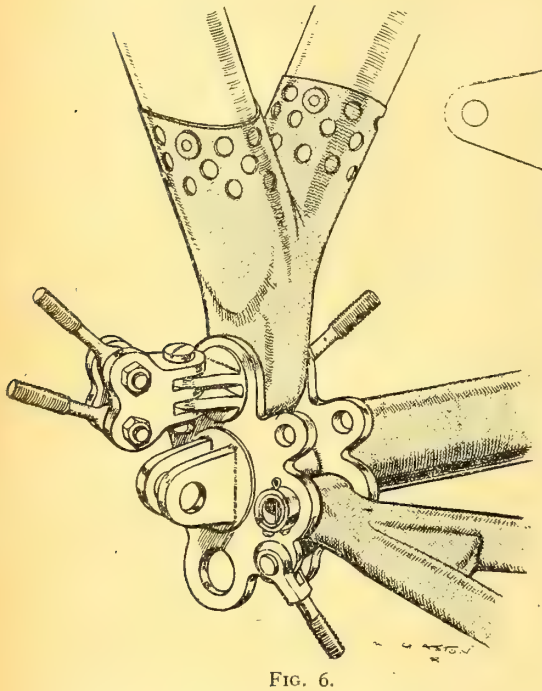


Fig. 6.

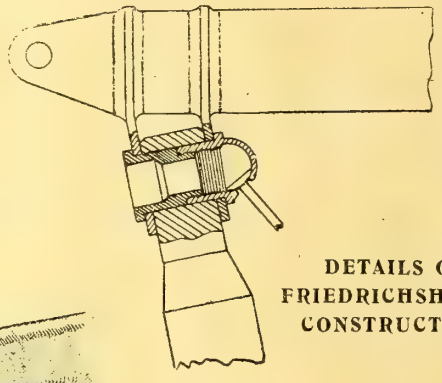


Fig. 7.

DETAILS OF FRIEDRICHSHAFEN. CONSTRUCTION.

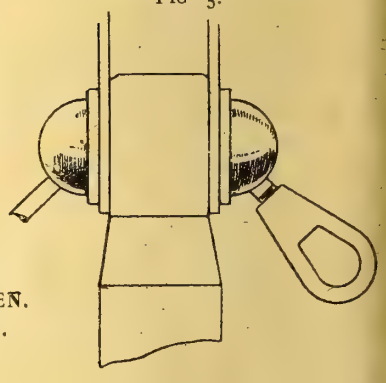


Fig. 8.

passage-way is provided, at each side of which are the racks for the smaller bombs.

Central Portion of Wings.

The central and non-detachable portion of the upper plane has a span of 19ft. 5in., whilst at each side of the nacelle the lower plane fixed portion measures 7ft. 8in. The main wing spars in this central portion are of steel tube, roughly 2in. in diameter, with a wall thickness of 1-16in.

These spars are braced by steel tubes arranged in the form of an X, the manner in which the bracing tubes are attached to the main spars being shown in the sketch Fig. 1.

The lugs are built up by welding, and are pinned and riveted in position, the joint being of the plain knuckle type.

The upper surface of the lower plane is, so far as the central section is concerned, covered in with three-ply wood.

In this portion the main ribs are of three-ply, with spruce flanges. Between each main rib is a cut-away rib, the design of which is shown in the sketch Fig. 2. This, unlike the main ribs, is one piece of wood, and not built up. For the greater part of its length it applies to the top surface only, being cut away to pass clear of the cross bracing tubes.

The plane is further stiffened with transverse members consisting of three-ply panels between each rib strengthened by grooved pieces top and bottom. The latter are attached as shown in the sketch Fig. 3, and the attachment of the flanges of the main ribs is shown in Fig. 4.

The central section of the upper main plane is in one piece and is covered top and bottom with fabric. In order to facilitate the removal of the engines, detachable panels measuring 1ft. 11½in. long by 1ft. 8in. deep are let into the trailing edge immediately over the engine bearers. These panels are socketed in front, and at the rear are joined up at the trailing edge with U section sheet steel clips and bolts.

The struts which connect the top of the nacelle to the upper plane are tubular and of streamline section, as are also the engine bearer struts. A section of one of the latter is given in Fig. 5. The thickness of the wall is one-sixteenth of an inch.

The method of attaching the lower end of the engine struts to the tubular steel spars is shown in the sketch Fig. 6, from which it will be seen that a welded Y socket is used and secured by a pin joint, the ends of the pin acting as anchorages for the attachment of the bracing wires.

This sketch also shows the lugs which respectively support the detachable portion of the main planes and the vertical strut of the landing chassis. The engine bearer struts are pushed into the Y socket and pinned in position, the pins being afterwards brazed into the socket. At their upper ends the engine struts are fixed to the top plane spars with pin joints, as shown in Figs. 7 and 8, the attachment differing according to the number of wire bracings that are to be taken to each joint.

Construction of Wings.

The detachable portions of the wings are fixed to the centre section by pin joints, one part of which is shown in Fig. 6, the male portion being represented in Fig. 9. The chord of the wing in the line of flight varies from approximately 7ft. 8in. to 7ft. 5in., and the wing section is shown shaded in Fig. 10. In order to provide a basis of comparison the R.A.F. 14 wing section is superimposed and drawn to the same scale.

The main spars are placed one metre apart, the front spar being 272 mms. in the rear of the leading edge. Both spars are of the built up box type, as shown in Figs. 11 and 12. The former is the leading spar and the latter the rear spar. These spars are of spruce, and each half is furnished with several splices, so that the greatest single length of timber in them is not more than 14ft. The splices, which occur in each half alternately, are of the plain bevel type about 15in. long and wrapped with fabric. A fabric wrapping is also applied at short intervals along the spar.

Internal cross bracing between the main spars is afforded by steel tube cross members and cables attached as shown in the sketch Fig. 9.

The main spar joint consists of a steel plate 19 mms. thick embedded in the spar end and held in position by 5 bolts, which pass through a strapping plate surrounding the end of the spar. This plate also carries the attachment for the bracing cable and is furnished with a spigot which locates the bracing tube. It will be seen that at this point the spar is provided with tapered packing pieces of hard wood glued and held in position by fabric wrapping.

The main ribs are placed 360 mms. apart. Between them are auxiliary formers, consisting of strips of wood 20 mms. × 10 mms. thick, which run from the leading edge to the rear spar. The main ribs consist of ply wood webs socketted into grooved spruce flanges, which are tapered off as shown in Fig. 4, except where they are met by a longitudinal stringer. The leading edge is solid wood moulded to a semi-circular section of approximately 65 mms. diameter. Where the rib web abuts against it, packing pieces are glued each side. Between the main spars the web of the rib is divided by three vertical strips into four panels and in each of these it is perforated, leaving an edge all round about 72 mms. wide.

As shown in Fig. 9, the upper flange of the main ribs is carried clear of the leading spar by means of packing pieces. In the case of the rear spar, packing pieces are also used under the rib flange as shown in Fig. 12.

The lower main planes for a width of about 2ft. 3in. at their inner end are covered as to their top surfaces with three-ply wood.

WESTLAND Aircraft.

WESTLAND AIRCRAFT WORKS.
BRANCH OF PETTERS LIMTD.
YEOVIL.

Phone, Yeovil 141. Telegram Aircraft Yeovil.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

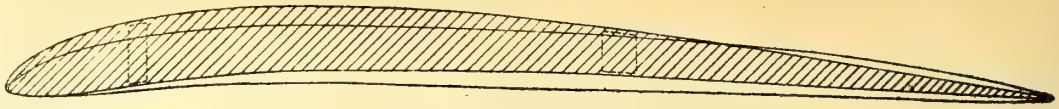


Fig. 10.

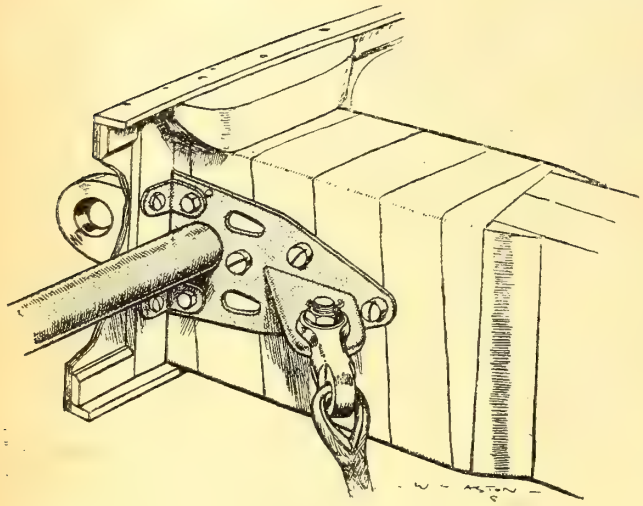


Fig. 9.

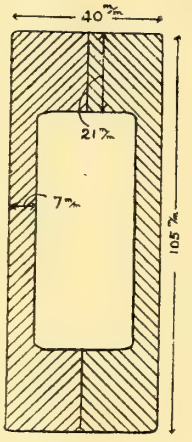


Fig. 11.

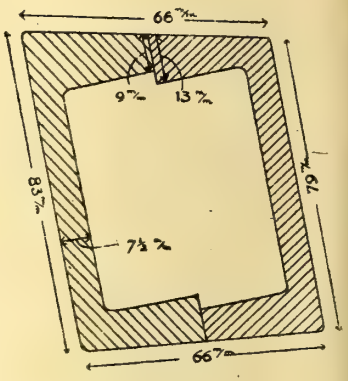


Fig. 12.

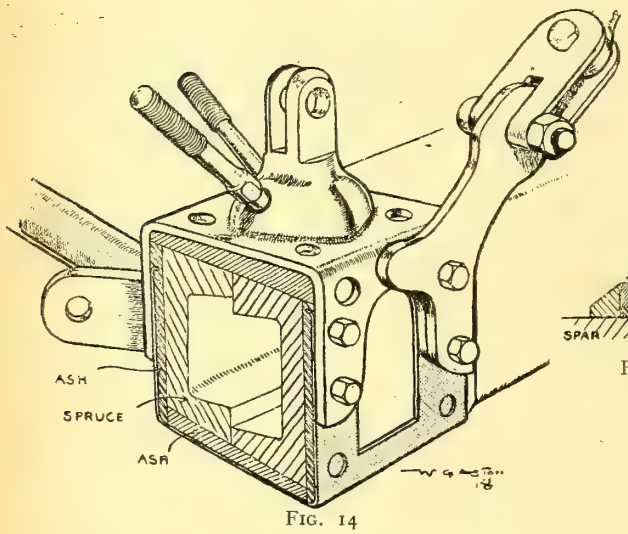


Fig. 14

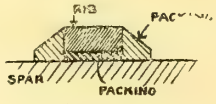


Fig. 13.

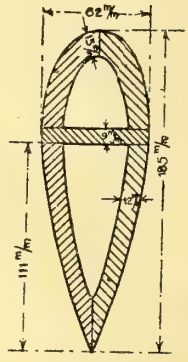


Fig. 15.

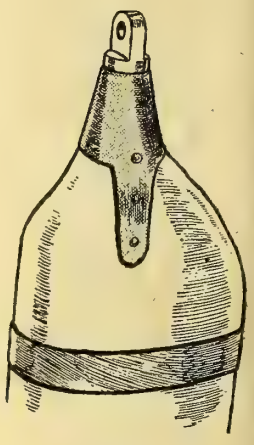


Fig. 16.

The interplane struts are attached to the main spars by joints of the type shown in Fig. 14. This, it will be seen, follows the typical German practice of partially universal jointed mountings for the cable attachments. At the points of attachment of these strut joints, suitably tapered packing pieces of hard wood surround the spars, which at these points are also wrapped with fabric.

Struts.

Outside of the centre section the interplane struts are of wood built up, as shown in the section Fig. 15, of five separate pieces. The curved portions are of timber which has not yet been identified, but is apparently of poor quality. The cross web is of ash. The strut is wrapped at frequent intervals with strips of fabric and is fitted with a socket joint of the type shown in Fig. 16. The outer pair of struts are of smaller section than the main struts, but are built up in a similar manner. Their section is 125 mms. × 40 mms.

Ailerons.

The framework is principally of welded steel tube wrapped with fabric.

A notable point is the thick section of the leading edge of the balanced portion, as shown in Fig. 17.

Fin and Fixed Tail-Planes.

The framework of these is steel tube and in the case of the tail-planes wooden stringers running fore and aft are arranged at intervals. The tail-planes are supported by diagonal steel tubes of streamline section, on the under side of which sharp steel points are welded to prevent these stays being used for lifting purposes.

Elevators and Rudders.

The framework in each case is of steel tube, the main tube being 35 mms. in diameter and the remainder 15 mms.

Bracing.

Throughout the wings, both internally and externally, the bracing is by means of multistrand steel cable.

Fuselage. (Rear Portion.)

At the after-gunner's cockpit the section of the fuselage has a rounded top, which is gradually smoothed down into flat. The section, for the greater part of the length, is rectangular, and the frame is built up in the usual manner with square section longerons and verticals, the joints being arranged as shown in Fig. 18. The cross bracing wires along the sides, top, bottom, and diagonal are of steel piano wire and are covered with strips of fabric, as shown in this sketch, where they lie adjacent to the fabric fuselage covering.

The vertical and horizontal compression members are located by spigots. The joint consists of a plate which completely surrounds the longerons, its two ends being riveted together to form a diagonal bracing strip. For the last few feet at the tail the fuselage is covered with thin three-ply.

The fuselage is covered with fabric, which is held in position by a lacing underneath and is consequently bodily removable.

The floor of the after-gunner's cockpit is elevated above the bottom of the fuselage. Immediately underneath this cockpit is a large trap-door, shown by dotted lines in the plan view of the aeroplane. This is hinged at its rearward end and furnished with two large celluloid windows. It is held in its "up" position by a long spring and a snap clip. No means could be found by which it could be fixed in its closed position. As footsteps are provided for all the cockpits, this trap-door is evidently not intended for ingress and egress. It could be employed in connection with a machine-gun firing backwards, as in the Gotha, but no machine-gun mounting was fixed in this machine for this purpose.



CELLON

(NON-POISONOUS)

DOPE

CELLON LTD.,

22, CORK STREET, LONDON, W.1.

Telephone—GERRARD 440 (2 lines). Te'egrams—"AJAWB, REG, LONDON."

Contractors to H.M. Government.

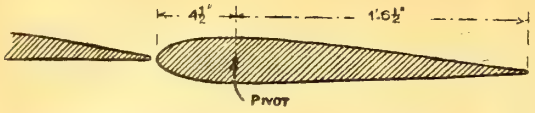
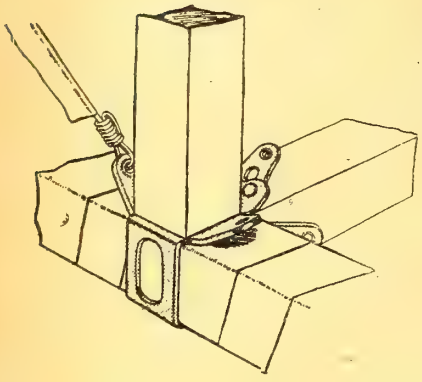


Fig. 17.



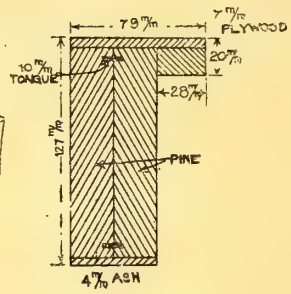


Fig. 20.

Fig. 18.

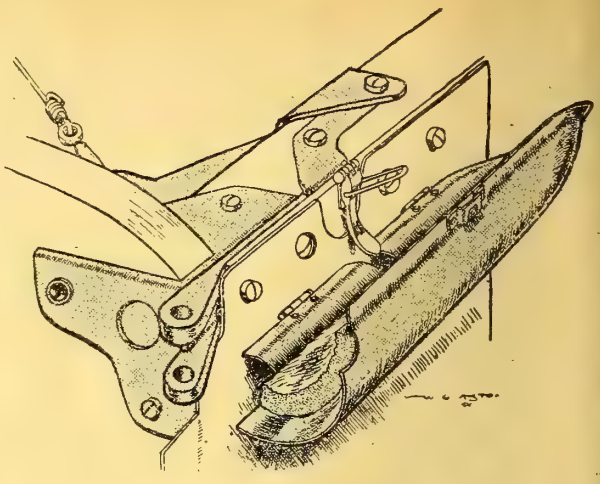


Fig. 19.

The rear portion of the fuselage is attached to the centre section of the body by a clip at each corner. This is shown in Fig. 19. The rear portion carries a male lug, which engages with the two eyes, and is held in position by a $\frac{3}{8}$ths bolt. Four other bolts in tension pass through the sheet metal clip, as shown in the sketch. In each case the lugs are furnished with sheet steel extensions which, as shown in the sketch Fig. 19, are sunk flush into the top and bottom surfaces of the fuselage longerons and are there held with three bolts. The corner joint is welded sheet steel, and there is an additional diagonal sheet steel joint which serves the secondary purpose of providing an anchorage for the bracing wires.

As this fuselage joint is level with the plane of rotation of the propellers, it is armoured both on the nacelle and on the rear portion of the fuselage with a hinged covering of stout sheet steel lined with felt. A plate of armour a foot wide also extends down each side of the nacelle at this point.

Forward Cockpit.

This is attached to the main body by four bolts with clips similar to those just described. It consists of a light wooden framework, covered throughout by three-ply.

The cock-pit can be divided off from the main cockpit by means of a fabric curtain. Its occupant is provided with the folding seat, and manages a gun and the bomb-dropping gear.

Engine Mounting.

The engine bearers have the section shown in Fig. 20, and are each built up of two pieces of pine united by tongues. On their top surface they are faced with ply wood, and at the bottom with ash. A strip of ash applied to the upper outer corner of the bearer gives it an "L" section, and has screwed into it the threaded sockets for the set screws of the lower part of the engine fairing. The engine bearers taper sharply at each end. They are mounted on the "V" struts by means of acetylene welded brackets, constructed as shown in sketch, Fig. 21. These, it will be seen, are of box form, and form a liner round the streamline tube.

The engine cowling is a particularly fine piece of work, and

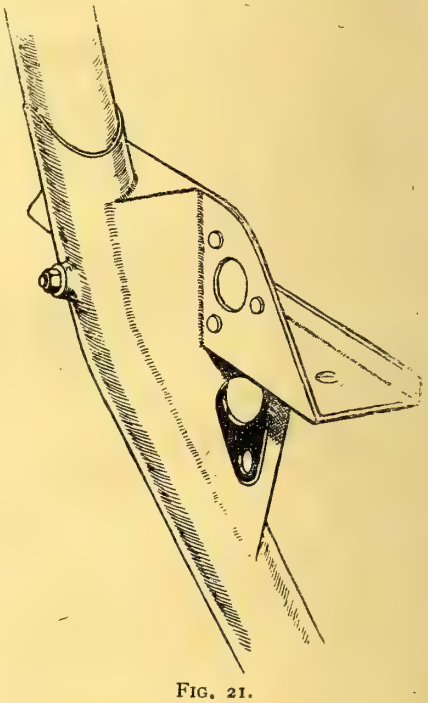


Fig. 21.

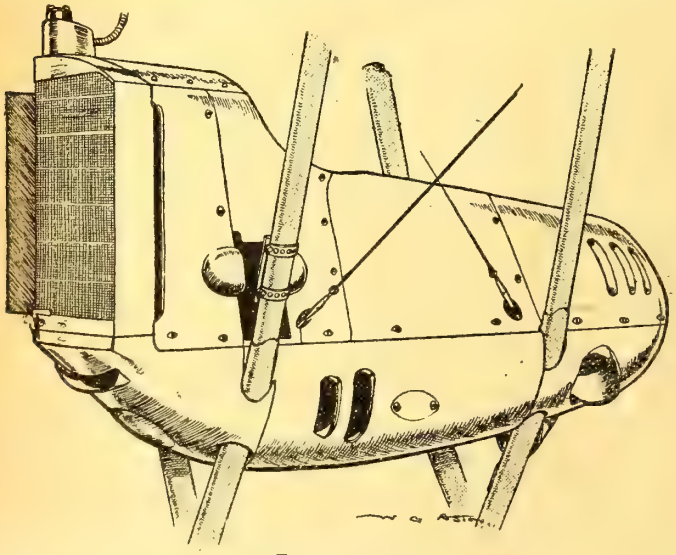


Fig. 22.

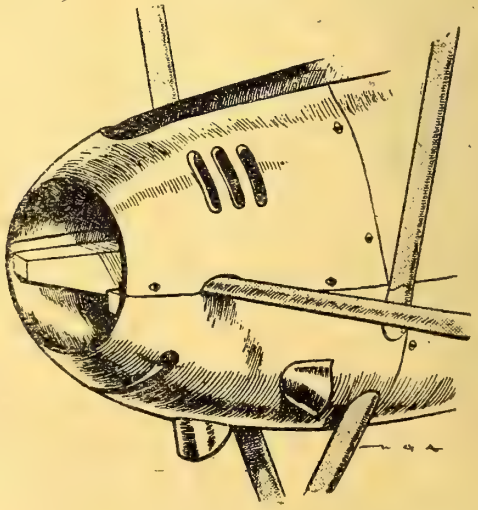
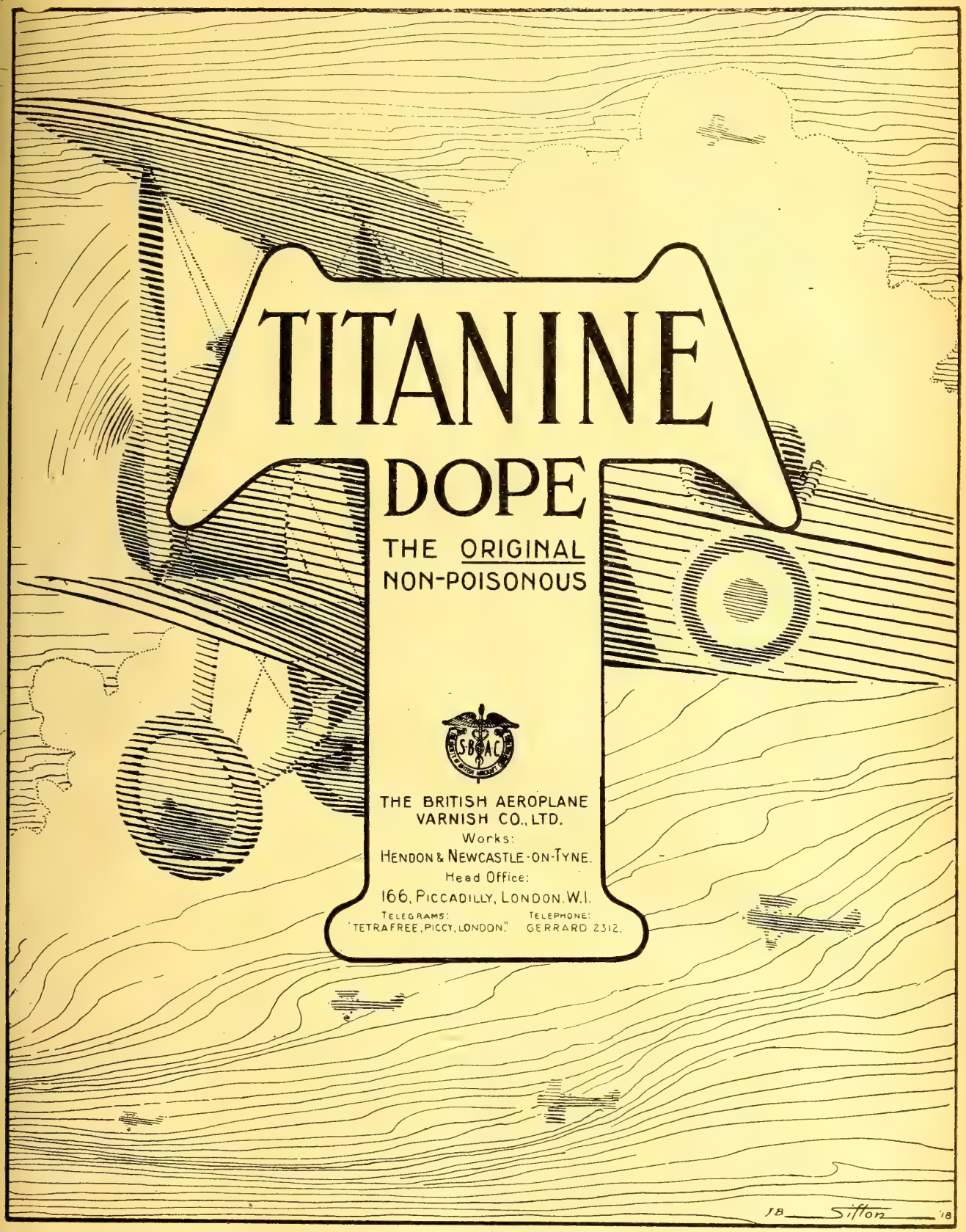


Fig. 23.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
Works:
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON. W.1.
TELEGRAMS:
"TETRAFREE, PICCY, LONDON."
TELEPHONE:
GERRARD 2312.
JB Sifton '18

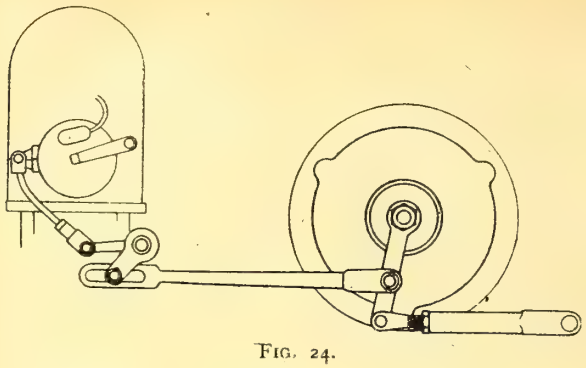


Fig. 24.

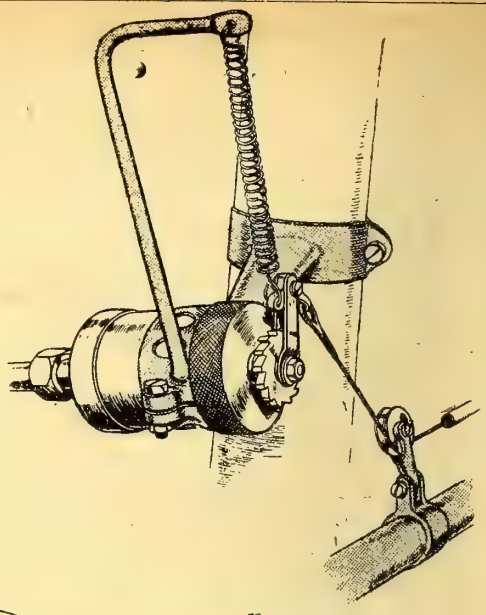


Fig. 25.

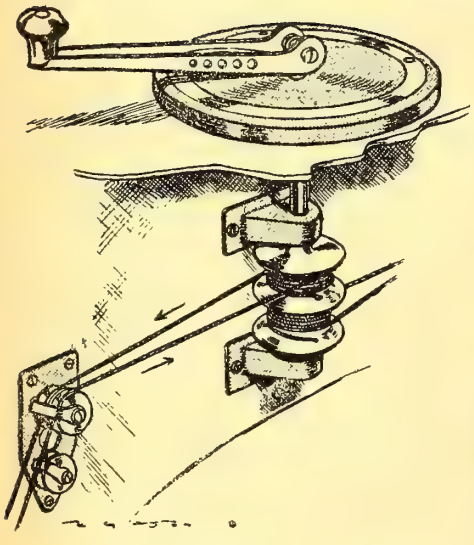


Fig. 26.

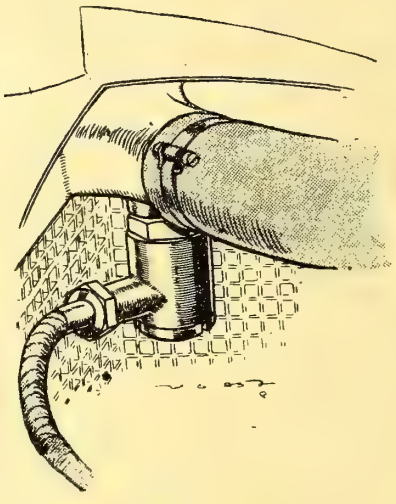


Fig. 27.

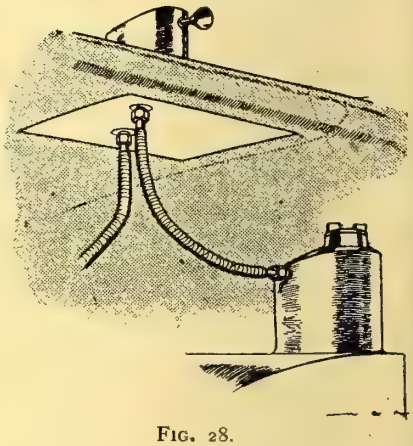


Fig. 28.

two views are given in sketches 22 and 23. The lower portion is attached to the engine bearers by set screws, but the upper part is readily detachable, being furnished with turn buttons. This cowling allows the cylinders of the engine to be exposed to the air. A large scoop is placed in front, so as to permit a free flow of air over the bottom and sides of the crankchamber, whilst at the rear three large trumpet-shaped cowls are provided so that a draught of air is forced against the crankcase in the neighbourhood of the carburetter air intake. In the rear the fairing abuts against the propeller nave, whilst in front it is attached to the radiator. It will be noticed that at each side of the radiator are narrow air scoops, the object of which is to promote a draught past the oil tank and front cylinder heads.

Engines.

The motors are the standard 260-h.p. Mercedes with six cylinders in line. Full details of this engine have been published, and it is only, therefore, necessary to notice one or two points in connection with the installation.

A new departure is the interconnection of the throttle and ignition advance controls. This is carried out in the manner illustrated diagrammatically in Fig. 24. It will be seen that a considerable movement of the throttle can be made independently of the ignition advance. In the Mercedes carburetter the throttle is so arranged that it cannot be fully opened near the ground without providing too weak a mixture, and it is thought possible that the full ignition advance is not obtained until this critical opening is reached.

On several German bombing aeroplanes grease pumps for lubricating the water pump spindle have been found. Fig. 25 shows the design as fitted to the Friedrichshafen. It consists of a ratchet and pawl operated grease pump, secured by a bracket to one of the engine struts, and worked from the pilot's cockpit by a lever, and a stranded steel cable passing over a pulley, the pawl being returned by a long-coiled spring.

The engine numbers are respectively MN.32299 and MN.36228.

The exhaust pipe is of new design, although it incorporates the well-known expansion joints attached to the flanges. It is fitted with what amounts to a rudimentary silencer, whereas in previous machines of a similar type to the Friedrichshafen an open-ended exhaust pipe was used.

Radiators.

Each radiator is provided with an electric thermometer fitted into the water inlet pipe, as shown in sketch, Fig. 27, these thermometers being wired up to a dial on the dashboard, which is furnished with a switch, so that the temperature of either radiator can be taken independently.

The radiators consist of square tubes to the number of 4,134, and measuring roughly 6 mms. each way.

The radiator block is V shaped in plan, and each is provided with a shutter which covers up a little more than a third of the cooling surface. This shutter is fitted with a stop, so that when fully opened it lies in the line of flight of the aeroplane. It is opened or closed according to circumstances by the gear, shown in the sketch, Fig. 26 of which the handle is mounted on the roof of the nacelle, immediately behind the pilot's seat. Three positions are provided for the handle, which operates the two shutters simultaneously by means of return cables.

Immediately above the main radiator, and let into the upper main plane between the front spar and the leading edge, is a small auxiliary tank, illustrated in Fig. 28. This is furnished with a trumpet-shaped vent in the direction of the line of flight, and is furnished with two outlets, one to the head of the main radiator, and the other to the water pump. The function of this tank is evidently to prevent the pump from priming.

Oil Pump.

The main supply of oil is carried in sumps forming part of the base chamber. A secondary supply of oil, from which a small fresh charge is drawn at every stroke of the oil pump, is contained in a cylindrical tank supported by brackets from the engine struts, and placed immediately behind the radiator. This tank has a capacity of 25 litres = 5½ gallons. Each tank is furnished with a glass level, which is visible from the pilot's seat.

Petrol Tanks.

The two main tanks which are placed, one under the pilot's

(*Continued on page 1727.*)

SELSDON

AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W. 1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO, CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.

ACCLES & POLLOCK LIMITED

MANUFACTURERS OF STEEL TUBING & PRESSWORK PARTS.

The Firm with the largest Aircraft experience in Tubular Components and Steel Presswork. Send us details of your requirements.

OLDBURY, BIRMINGHAM.

Telegrams: "Accles, Oldbury."
Code: A.B.C., 5th Edition.
Telephone: Oldbury 111 (4 Lines).

Trade Mark. ANKH *Means Long Life.*

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office and Works:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 4617 4648 HAMPSTEAD.

Scottish Factory and Aerodrome:

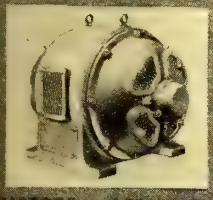
ALLOA.

Cable and Telegraphic Address: "CAUDROPLAN, ALLOA." Phone: 52.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.


CABLES.


OVERHEAD LINES.


MOTORS and GENERATORS.


SWITCHGEAR and TRANSFORMERS.

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E.7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159W.George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

HANDLEY PAGE LTD.

CONTRACTORS TO THE ADMIRALTY AND WAR OFFICE

CRICKLEWOOD, LONDON, N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON

Contractors to the Admiralty and Air Board.

THE

CENTRAL AIRCRAFT COMPANY

DESIGNERS AND CONSTRUCTORS OF AIRCRAFT.

Office and Works:
KILBURN, N.W.6.

Telegrams: Aviduction, Phone, London.
Telephone: Hampstead 4403, 4404.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

The "Guardian Angel" Parachutes

THE GUARDIAN ANGEL PARACHUTES
TRADE MARK
(REGISTERED)

THE CLASS OF OUR LIFE-SAVING EQUIPMENT.

The basic characteristics of our Parachutes, which differentiate them from all others, and for which we hold master-patents, are automatic (i.e., compellative) opening, and static and kinetic control (i.e., control at rest and in action) of all their component details. The ordinary parachute is under no sort of control, and what we have accomplished is to convert this most insubordinate Apache of the Air into a staid servitor, incapable of acting in any other than the designed way. We have made the Parachute into an automatic machine, so that failure to open and entanglement of rigging has become a physical impossibility. Every Type of Parachute made by us possesses these paramount and indispensable principles of machine action. The aviator makes his jump, and the Parachute automatically does the rest.

THE RANGE OF OUR LIFE-SAVING EQUIPMENT.

Life-saving Parachutes for school machines on the Training Grounds.

Life-saving Parachutes for heavy bombing machines, fighters, and scouts.

Life-saving Parachutes with minimum weight and without additional air resistance for the fastest machine that flies, and capable of release from any vertical or horizontal angle, or when flying upside down.

Basket-Parachutes for instantly detaching the basket Balloons, with a high but constant-speed initial drop from a fired gas-bag, automatically opening into the low-speed descent required for a safe landing.

Basket Parachutes for instantly detaching the basket containing two observers, their instruments and records, from a fired gas-bag, with high-speed initial fall, changing automatically to slow-speed descent for the safe landing. Parachute instantly released on landing, to avoid dragging the basket.

Variable-speed Parachutes, to permit a sudden high-speed drop, controlled by the Parachutist, to escape from an enemy aeroplane, and to stop on any portion of the grade of descent to avoid an objectionable landing. This variable-speed apparatus is applicable to the whole range of our Parachutes.

Non-spinning shock-absorber slings, taking all shocks off Parachute and man.

Aviator's Harness, distributing the stresses over those parts of the body best able to sustain them, and instantly releasable when alighting on land, on a roof, in a tree, or in water.

OUR EQUIPMENT IS THE RESULT OF ENGINEERING SCIENCE APPLIED TO DIFFICULT AIR PROBLEMS. WE BELIEVE THAT ITS EXTENDED USE WILL DOUBLE THE FLYING LIFE OF OUR FIGHTERS AT THE FRONT.

RELIABILITY—First. RELIABILITY—Second. RELIABILITY—ALL THE TIME.

E. R. CALTHROP'S AERIAL PATENTS, LTD.

ELDON STREET HOUSE, ELDON STREET, LONDON, E.C.2.

Telephones (2 lines): London Wall 3266 and 3267. Telegraphic and Cable Address: "Savemalivo-Ave-London."



W. CANNING & Co.

Lustre Works, Gt. Hampton Street.

AND 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

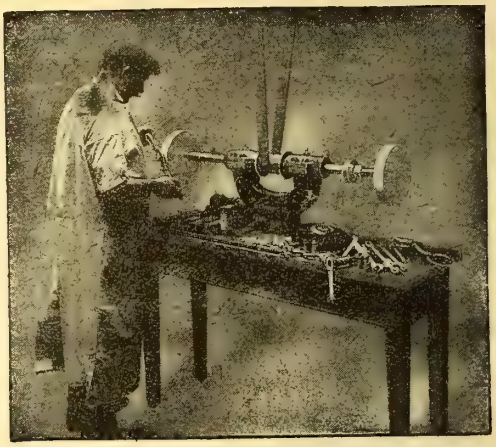


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.



The
WIGHT
SEAPLANE

J. Samuel White & Co. Ltd
EAST COWES
I. of W.
AIRCRAFT CONSTRUCTORS
Telegrams, WHITE, EAST COWES.
Telephone. No 3 COWES

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

TWO COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

Addresses of our fine Saw Mills, Works, etc., — have been camouflaged by the Censor. —

Offices only: 141, CURTAIN ROAD, E.C.

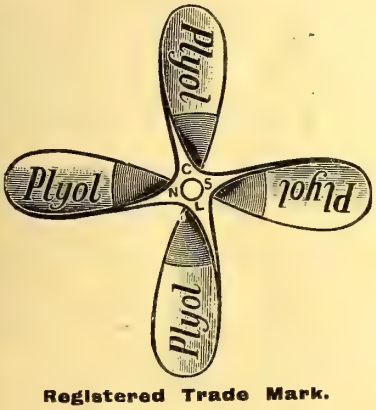
CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS, — STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

"PLYOL"

THE BEST CEMENT FOR THREE-PLY, Veneering, etc.



Registered Trade Mark.

ALDGATE CASEIN WORKS.

NIEUWHOF, SURIE & Co., Ltd.

HEAD OFFICE

5, Lloyds Avenue, London, E.C. 3.

Works:

ALDGATE AVENUE, ALDGATE, E.C.

Also Casein especially adapted for Waterproof Paints, Varnish, etc.

Telephones AVENUE 34, 35.

Telegrams: "SURICODON, FEN LONDON."



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd, The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)

Dawson, John, & Co., Ltd., Victoria Works, Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 912.

Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Martinsyde Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171.

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester. City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes." Cowes 193.

Short Bros Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 1988 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships— Wimbledon 1314.

Airships, Ltd., High Street, Merton.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand and Die)

Coan. R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 7846.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings— Avenue 995, 996, and 7006.

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1. Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1. Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (4 lines).

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4728. "Aviduction, Phone, London."

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellutate, London." Regent 4046.

The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg. London." Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203.

Gwynnes, Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3096.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 985.

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Elev... London." Walthamstow 408 (...

Electrical Accessories—

Belling & Co., Derby Road Works, Mo... Road, Upper Edmonton, N.18. "B... Edmonton." Tottenham

Johnson & Phillips, Ltd., Charlton, L... S.E.7. "Juno, London." Central 2207, London Wall

Mann, Egerton & Co., Ltd., 177, Cle... Street, London, W.1. "Installing, ... road, London." Museu...

Premier Electric Heaters, Ltd., 258, 259 360, Bradford Street, Birmingham. ...renheit, Birmingham." Midland

The Rotax Motor Accessories Co., Ltd., ...toria Road, Willesden Junction, N. "Rodynalite, Phone, London." Willesden

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, C... try." Coventry

Johnson & Phillips, Ltd., Charlton, Lo... S.E.7. "Juno, London." Central 2207, London Wall

Electric Lighting and Powe...

E. Stanley Fardon, A.M.I.E.E., 67, ... Street, Manchester

Johnson & Phillips, Ltd., Charlton, Lo... S.E.7. "Juno, London. Central 2207, London Wall

Electro Platers and Me... Polishers' Engineers—

W. Canning & Co., 133-137, Great Ha... Street, Birmingham. "Materials, ...mingham. Birmingham 3622 Central (3 l...

Enamel—

Silico Enamel Co., New Cross, London,

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, ...don, S.W.1. "Edibrac, 'Phone, Lon... 3540 Victoria (3 l...

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redd... "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot ...lage, Bournemouth. "Etches, Winton Bournemouth

Cambridge School of Flying and Aerodrome, 308, St. Andrews St., Cambridge. "... bon, Cambridge." Cambridge 5 and

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pave... House, London, E.C.2. London Wall 573 and ...

Galvanising—

Boulton & Paul, Ltd., Rose Lane W... Norwich. "Aviation, Norwich." Norwich

Gauges—

J. A. Prestwich & Co., Northumberland ... Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, A... Birmingham. "Mosgear, Birmingham

Glue—

Cannon, B., & Co., Ltd., Lincoln. Lo... Office, 110, Cannon Street, E... "Bececolin, Cannon, London." City

Improved Liquid Glues Co., Ltd., Gt. He... tage Street, E. (Croid.). "Excroi... Wapp, London." Avenue ...

Mendine Co., 8, Arthur Street, E.C. Bank ...

Oldroyd, Wm., & Sons, Ltd., 9, Mincing L...

Goggles— E...

Triplex Safety Glass Co., Ltd., 1, Albem... Street, Piccadilly, W.1. "Shatterlys, Pi... London." Regent ...

Hack Saw Blades a... Machines—

Victor Saw Works, Ltd., 2 and 3, ... Street, Finsbury Circus, London, Vicsaw, Phone, London." London Wall ...

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & ... Southwark Street, London, S.E.1. "Kin... London" Hop 372 (2 lin...

Sturtevant Engineering Co., Ltd., 147, Q... Victoria Street, London, E.C.4. "S... tevant, London." Central 7121 (6 lin...

Hollow Spars—

McGruer Bentwood Hollow Spar Co., C... mercial Wharf, Lambeth, S.E. "Gabi... son, Watloo, London." Hop

Robert Young's Construction Co., Ltd., Car... bury Works, Canonbury Street, Essex I... London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery L... W.C.2. Holborn ...

Buyers' Guide.



truments (Scientific, Altimeters, etc.)—

he Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge" Cambridge 642.
hort & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

gneto Driving Pieces—

lerbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

gnetos—

he M-L Magneto Syndicate, Ltd., Victoria Works, Coventry. "Corlton, Coventry." Coventry 1008-1009.
he British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicksmag, Phone, London." Museum 430
he British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

tal Manufacturers—

lifford, Chas., & Sons, Ltd., Birmingham. "Clifford, Birmingham." Central 42-43.

tals in General—

Avenue 1432
uthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
ritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 905, 906, and 7006.
amuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

:al Parts and Fittings—

ccles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
eroplane General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppiskout, Holborn, London." Holborn 4959.
ircraft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2. Upcast, Rand, London" Gerrard 276 (2 lines).
rnott & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2267.
ayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.
lackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
ritish Metal (Kingston), Ltd., Kingston-on Thames
uthrie J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432.
ombard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).
lann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston Road, London." Museum 70.
lountford, Fredk., Ltd., Fremo Works, Lifford, Birmingham "Fremo, Birmingham." Kings Norton 261
obertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3906.
ubery, Owen, & Co., Darlaston South Staffs.
ankey, Joseph & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66
he Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.
he Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
he Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.
hompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.
Vooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

tal Shearing Tools—

Montgomery, Smith, & Co., Ltd., Tangent Works, Keynsham, near Bristol. "Ingenuity, Saltford" Keynsham 21.

tal Spinnings—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.

tric Bolts—

Cashmore Bros., Zota Works, Hildreth Street, Balham, S.W. Battersea 415.
Rubery Owen & Co., Darlaston, South Staffs.

scellaneous—

Anderson, D., & Son, Ltd (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.
Bowden Wire, Ltd., Willesden Junction. "Bowirelim, Harles, London." Willesden 2100 (3 lines).
British Metal (Kingston), Ltd., Kingston-on-Thames.
Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.
MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Eusroad, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.
The Clegg Metal Engraving Co., Chatsworth Works, Worthing. "Clegg Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemaiivo, Ave, London" London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry" Coventry 723.
The Standard Piston Ring and Engineering Co., Ltd., Premier Works, Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 6, Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks Weybridge." Weybridge 520-521.
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 201, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 26.

Radiators—

Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Galyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217
Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50 Park Lane, Leeds. Central 3473.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.
British Metal (Kingston), Ltd., Kingston-on-Thames
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co. Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.
Ripault, Leo, & Co., Ltd (Oleo Plugs), 642, Poland Street, W.1 "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Imperial Steel Works, Sheffield. "Allen, Sheffield." Sheffield 4607.
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Davhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Fremo Works, Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

Brown, R. F., & F. W., Wollaton Saw Mills, near Nottingham. "Brown's Saw Mills, Wollaton." Nottingham 1526.
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 406.
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.
J. Owen & Sons, Ltd., 100a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines)

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London" Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane Works, Norwich "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol" Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., Palmerston Works, High Road, Kilburn, N.W.6. "Aviduction, Phone, London" Hampstead 4493 and 4494

Davidson Aviation Co., Ltd., Hammersmith, W.S. Hammersmith 1992 (3 lines)

Dawson, John, & Co., Ltd., Victoria Works, Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydroplid, Crickle, London." Hampstead 780

Hooper & Co., Ltd., 54, St James's Piccadilly, London, S.W. "Sociable, St James, London." Regent 012.

Mann, Egerton & Co., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).

Martinsyde Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Weybridge 331; Byfleet 171.

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London" Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor" Bognor 48

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6 "Carbodis, London." Putney 2240-2241

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester. City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193

Short Bros, Rochester, Eastchurch and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378

Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 1088 (8 lines)

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickersita, Knights, London. Kensington 6800

Waring & Gillow, Ltd., Hammersmith "Warisen, Ox, London." Museum 5000

Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120

White J. Samuel, & Co., Ltd., East Cowes "White, East Cowes" Cowes 3

Whitehead Aircraft (1917), Ltd., Richmond Surrey "Whitecraft, Richmond, Surrey" Richmond 1862

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton Wimbledon 1314

Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand and Die)

Coan R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London" Museum 406

Also at Market Harborough, Leicestershire "Hoptons, Market Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds" Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pratt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" Avenue 995, 996, and 7006.

Buildings—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich" Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Willey Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 1306-7.

Clothing—

Burberrys, Ltd., Haymarket S.W.1 Regent 2163

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)

Central Aircraft Co., Palmerston Works, High Rd., Kilburn, N.W.6. Hampstead, 4738. "Aviduction, Phone, London"

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond" Richmond 1681

Thompson Bros (Bilston), Ltd., Bradley, Bilston, England "Thompson Bros. Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, L. & Co., 30, Newgate Street, E.C.1 And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London" Regent 4046

The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg, London." Gerrard 440.

Clark, Ingham, Robt., & Co., Ltd., Waller House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London" Regent 3923.

Engines and Parts—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford. "Pump, Bedford" Bedford No. 1.

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282

The Beaumont School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London" Vic 7020

Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge" Weybridge 550 (7 lines)

Green Engine Co., Ltd., Twickenham Richmond 1205

Gwynnes Ltd., Hammersmith Iron Works, Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1010

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London" Gerrard 8926.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3906

Rolls-Royce Ltd., 14 and 15, Conduit St., W.1. "Rolload, London" Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton" Wolverhampton 985

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W., London" Walthamstow 180.

Electrical Accessories—

Belling & Co., Derby Road Works, Upper Edmonton "Belling, Edmonton" Tottenham 1

Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London" Central 2207, London.

Mann, Egerton & Co., Ltd., 177, Wardour Street, London, W.1. "Lastic, London"

Premier Electric Heaters, Ltd., 232, 360, Bradford Street, Birmingham "Premheat, Birmingham" Midland 1

The Rotax Motor Accessories Co., Ltd., Victoria Rd., Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480

Electric Cables—

E. Kalker & Co., Coventry. "Kalkerite, Coventry."

Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Central 2207, London.

Electric Lighting and Power—

E. Stanley Pardon, A.M.I.E.E., 2, Mosley Street, Manchester

Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Central 2207, London.

Electro Platers and Metal Polishers' Engineers—

W. Canning & Co., 133-137, Great Hampton Street, Birmingham. "Matchless, Birmingham" Birmingham 3622 Central.

Enamel—

Silico Enamel Co., New Cross, London

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibrac, 'Phone, London" 3540 Victoria.

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Flying Schools—

Bournemouth Aviation Co., Ltd., Throop Lodge, Bournemouth. "Etches, Bournemouth"

Cambridge School of Flying and Aeroplane, 308, St. Andrews Str., Cambridge, "Caubridge" Cambridge

Furniture (Office)—

Coolee's (Finsbury), Ltd., Finsbury Pavement House, London, E.C. London Wall 573 and 574

Galvanising—

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich" Norwich 851.

Gauges—

J. A. Prestwich & Co., Northumberland Road, Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham "Mosgear, Birmingham"

Glue—

Cannon, B., & Co., Ltd., Lisson Grove, Office, 110, Cannon Street, E.C. "Boccolin, Cannon, London"

Improved Liquid Glues Co., Ltd., Glue Cottage Street, E. (Croid) "Emcroid, Wapp, London"

Mendine Co., 8, Arthur Street, E.C. "Mendine"

Oldroyd Wm., & Sons, Ltd., 9, Minories, E.C.3

Goggles—

Triplex Safety Glass Co., Ltd., 4, Queen Street, Piccadilly, W.1 "Slatoids, London" Regent

Hack Saw Blades

Machines—

Victor Saw Works, Ltd., 2 and 4, Eyre Street, Finsbury, London, E.C. "Victosaw, Phone, London" Holborn 3

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65, Caxton Street, Southwark Street, London, S.E.1. "Hevacuate, London" Hop 1277

Sturtevant Engineering Co., Ltd., 72, Victoria Street, London, E.C.4. "Blowfan, Sturtevant, London" Central 7707

Hollow Spars—

McGruer Brentwood Hollow Spar Co., 2, Commercial Wharf, Limehouse, E. "Mcgruer, London"

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3906

Robert Young's Construction Co., Ltd., Ashburs Works, Canonbury Street, Essex, London, N.1

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2.

Buyers' Guide.



Instruments (Scientific, Altimeters, etc.)—

Cambridge Scientific Instrument Co., Ltd., The, Cambridge Instrument, Cambridge "Cambridge" Cambridge 642.

Hicks, Hughes & Mason, Ltd., Maddenhall Road, Bilston, Staffs. "Aneroid, Phone, Bilston" Walthamstow 180.

Magneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Magnetos—

The M.L. Magneto Syndicate, Ltd., Victoria Works, Coventry "Corlton, Coventry" Coventry 1008-1009.

The British Lighting & Ignition Co., Ltd., 32, Tottenham Court Road, W.1. "Vickspal, London" Museum 440

The British Thomson-Houston Co., Ltd., Lower Fort Street, Coventry "Asterfoil, Coventry" Coventry 278.

Metal Manufacturers—

Bickford, Chas., & Sons, Ltd., Birmingham Central 4243

Metals in General—

Avenue 3432

Lewis, J. B., & Son, 30, St. Mary Axe, E.C.3

Pratt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" Avenue 995, 996, and 7006

Samuel Mercer & Co., 108, Upper Thames Street, E.C.4. "Reconciled, Cannon, London" City 6342

Metal Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)

Adams, Geo., General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, London "Zeppelhook, Holborn, London" Holborn 4059

Aircraft Supplies Co., Ltd., Aval House, 10a, Long Acre, W.C.2 Gerrard 276 (2 lines)

Allen & Simpson, Ltd., Hythe Road, Willesden Junction Willesden 2205.

Bayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts) "Bayliss Wolverhampton" Wolverhampton 1021.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)

British Metal (Kingston), Ltd., Kingston-on-Thames

Brown, R. P., & F. W., Wollaton Saw Mills, near Nottingham "Brown's Saw Mills, Wollaton" Nottingham 1526

Cornelius & Son, Ltd., Roofers, Belfast "Cornelius, Belfast" Belfast 2033-2034-2035.

Crichton Bros., Ltd., Wire, Willesden Junction. "Crichton Bros, London"

Darlaston Rolling Mills, Ltd., Darlaston, South Staffs. "Darlaston" Darlaston 1

Dunlop Rubber Co., Ltd., Aviation Dept., 14, Regent Street, S.W.1 Regent 2033-2034-2035.

Eclipse Wire, Ltd., Willesden Junction. "Eclipse, Willesden, London"

Elliott, Wm., & Sons, Ltd., Birmingham (Rivets) "Elliott, Birmingham" Central 2243 (2 lines)

Evans, Edgar, & Co., Wolverhampton "Evans, Wolverhampton" Wolverhampton 2100 (2 lines)

Fentons Bros., Ltd., Great Eastern Street, London, E.C. "Fentonwed, Bethnal, London" Bethnal Green 1200

Ford Co., Ltd., Chapel-en-le-Frith "Fordcoltd, Chapel-en-le-Frith" Chapel-en-le-Frith 3

Forrest, J. & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Braids City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282

Mann, Egerton & Co., Ltd., 379-381, Euston Road, London, N.W.1 "Manegerton, London" Museum 760

Standard Motor Car Co., Coventry "Dushbro, Coventry" Coventry 330-34 (4 lines)

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames

The Cogg Metal Engraving Co., Chiswick Works, Worthing "Cogg, Worthing"

Observation Panels—

Triplex Safety Glass Co., Ltd., 4, Albemarle Street, Piccadilly, W.1. "Shatterless, Picc, London" Regent 7340

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Lidon Street House, Lidon Street, London, E.C. "Savemanno, Ave, London" London Wall 3266-3267

Pattern Making—

Freak, Ward, & Co., 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 23

The Standard Piston Ring and Engineering Co., Ltd., Premier Works, Don Road, Sheffield. "Oscon, Sheffield" Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15

Power Presses and Dies—

Bliss, E. W., & Co., 21, Pocock Street, Blackfriars Road, London, S.E.1 "Blissdon, London" Hop 4330

Presswork—

Rubery, Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines)

Boulton & Paul, Ltd., Rose Lane Works, Norwich. "Aviation, Norwich" Norwich 851

Fhoto Propeller Co., 11 & 12, Sutton Park Terrace, Kingston-on-Thames "Photo, Kingston" Kingston 422

Integer Propeller Co., Ltd., "Integer House, London" Hendon 1, Bowling 1

Lang Propeller, Ltd., Weybridge. "Aeroskids, Weybridge" Weybridge 520-521

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines).

Oddy, W. D., & Co., Leeds. "Arrowsaws, Leeds" Central 201 Leeds

Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347

Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120

Pyrometers—

The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth Letchworth 20

Radiators—

Gillis Radiator Co., Ltd., 108, Great Portland Street, W.1 "Gillsrad, London" Museum 4826

Rigging for Aircraft—

Cradock, Geo. & Co., Ltd., Wakefield, England "Cradock Wakefield" Wakefield 460

Rubber Tubing & Accessories—

Hancock, James, Lane, Ltd., 200, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester "Semloh, Manchester." City 4432

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)

Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 217

Mann, Egerton & Co., Ltd., Aircraft Works, Norwich. "Motors, Norwich" Norwich 482 (4 lines)

The Norman-Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor" Bognor 48

Short Bros., Rochester. "Seaplanes, Rochester" Chatham 65.

Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 337.

Seats for Aeroplanes—

Bowser, E., Art Cane Works, 50, Park Lane, Leeds. Central 3473

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibrac, 'Phone, London" 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Rd., Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480

Shackles—

British Gold Stud & Ring Co., Ltd., Hounslow, Middlesex. "Gold, Hounslow" Hounslow 254

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480

Universal Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines)

W. H. Bayliss & Co., Ltd., 51 and 52, Park Street, Birmingham "Brisf, Birm" Central 550

British Metal (Kingston), Ltd., Kingston-on-Thames

Ford Motor Co., Ltd., 88, Westcott Road, Aston Junction, Birmingham Aston, Birmingham

Rubery, Owen & Co., Darlaston, South Staffs

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Vic 4830.

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames

Rubery, Owen & Co., Darlaston, South Staffs

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Vic 4830

The Standard Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selcero, Phone, London" Regent 1181.

Arthur Bird & Co., 5, Lower Red North, Kensington, W. Park 1413

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosun, Westcent, London" Museum 2455.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby "Sparcato, Rugby" Rugby 262

Rounds, Tom, & Co., Ltd., 16, Wenlock Basin, Wenlock Road, City Road, E.C.1 "Rotor, London" Gerrard 7758

Springs—

Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines)

Stampings—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3

Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Imperial Steel Works, Sheffield "Allen, Sheffield" Sheffield 4607.

Firth, Thos., & Sons, Sheffield "Firth, Sheffield" Sheffield 2230 to 2237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432

Nicklin, Bernard, & Co., Birmingham "Bernico, Birmingham" Smethwick 224

Steel Stamps and Markings—

John, Morton & Sons, Cleveland Works, Cleveland Street, Mile End, E.1. "Dashur, Phone, London" East 2338 (2 lines)

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Taper Pins—

Mountford, Frank (Birmingham), Ltd., Fremo Works, Lafford, Birmingham "Fremo, Birmingham" King's Norton 261-262

Tapes and Smallwares—

MacLennan, John & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115.

Timber—

Brown, R. P., & F. W., Wollaton Saw Mills, near Nottingham "Brown's Saw Mills, Wollaton" Nottingham 1526

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London" Museum 406

Also at Market Harborough, Leicestershire "Hoptons, Market Harborough" Market Harborough 13

J. Owen & Sons, Ltd., 15 & 16, Berners High Street, S.E.1. "Bucheron, London" Hop 3611 (2 lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers—
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Standard Works, Lawrence Road, Tottenham, N.15.
Barimar, Ltd., 10, Poland Street, W.1. "Bariquamar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Railway Works, Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

By Royal Warrant of Appointment.

ESTABLISHED 1819.

ARNOLD & SONS,

Engineers and Instrument Manufacturers,

Sheet Metal Work, Sheet Metal Pressing, Stamping, Spinning, Acetylene Welding, Nickel Plating, Silver Plating, Electro Tinning, etc., etc.

STANDARD WORKS, LAWRENCE ROAD, TOTTENHAM, N.15.
Head Office: GILTSPUR STREET, E.C.1.

Telegraphic Address:—"Instruments," London. Telephone Nos.:—City Office: 5240, 5241, 5242 City. Factory: 2370 & 2371 Tottenham.

HEATING AND VENTILATION

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. **Wire: "KINNELL-BOROH-LONDON."**

CHAS. P. KINNELL & Co., Ltd., SOUTHWARK ST., LONDON, S.E.1

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street, Hanover Square, W.1.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

OFFICE AND WORKS—

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

CONTRACTORS TO THE AIR COUNCIL.

ESTABLISHED 1912

The SUPERMARINE
Aviation Works, Ltd.

DESIGNERS & CONSTRUCTORS OF FLYING BOATS.

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. SCOTT-PAINE, Director & Gen. Manager.

SBAC — The Society of British Aircraft Constructors

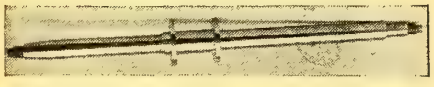
Offices, Works, & Flying Waters—
SOUTHAMPTON, Eng.



Here is the sliding-pinion shaft from the De Dion lorry mentioned by E.N.D. in "The Highway." Note point of breakage.



Barimar welds the shaft.



Barimar machines, cleans up, and makes it ready for fitting. Another example of Barimar service.

A Broken leg may not interest you until you break your own

E. N. D., in "The Highway" for March, 1918, says: "In ordinary circumstances the Barimar 'before' and 'after' pictures would never keep me awake." But one morning, a friend of E. N. D., opened the gear-box of his De Dion lorry and found that the sliding-pinion shaft was "done in." An application to the makers failed to produce a new part—nothing in stock. E. N. D. then suggested to his friend that the broken part should be "rushed" to Barimar.

At 11 o'clock on Saturday morning, the broken shaft was delivered to Barimar, and at 2.45 on the following Tuesday the owner was notified that repair was ready.

E. N. D. adds: "I have not asked De Dion the price of a new gear-shaft, but I guess it would be at least four or five times as much as that of repairing the broken one."

That is the Barimar way. During the time some people waste in writing, telegraphing and telephoning about replacements, Barimar can make the repair, and save the owner money, time and worry.

Let these points soak in. It will pay you one day.

THE WONDERS OF WELDING

are treated in a crisp snapshot style in Barimar Manual "B.C.," entitled "The Welding Test." A copy is yours free by post if you have a broken part you want repaired. If you are only interested in the book, please send 3 penny stamps for postage.

Ask for Manual "B.C.," and mention The Aeroplane.

To get it to Barimar and "cut out the cackle"

Remove all fittings. Attach label with your name and address. Pay carriage. Advise by post with full instructions.

Address Repairs to Dept. "B.C."—

BARIMAR

LIMITED,

Scientific Welders of Unlimited Resource,

10, Poland Street, London, W.1.

Telegrams: Bariquamar Reg. London. Telephone: Gerrard 8173

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
Capacity: 2 pints of glue.
Loading: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
Weight: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams
JONAS,
SHEFFIELD.

REGISTERED
I C NOVO
TRADE MARKS.

Telephone
No. 4660.
Private Branch
Exchange.

SIR JOSEPH JONAS, COLVER & Co., Ltd.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

H. & O., Ltd.

Harris & Others, Limited,

AIRCRAFT CONSTRUCTORS,

Old Town, Clapham, S.W.4.

Phone: Battersea {1238 1047

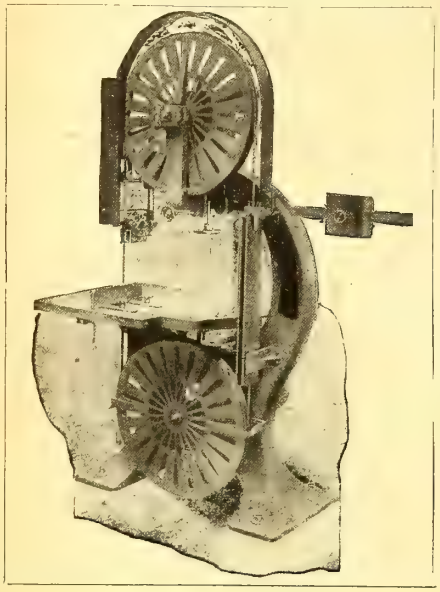
WOODWORK, METALS, COVERING AND DOPING.

Sub-Contractors to leading Aeroplane Builders.
On Admiralty and War Office Lists.

HAIGHS

(OLDHAM) LIMITED

MANUFACTURERS OF ALL TYPES OF WOODWORKING MACHINERY.



C.K.S. Type High Speed

Band Sawing Machine

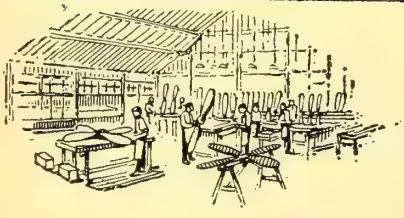
BUILT IN THREE SIZES
WITH SAW PULLEYS.

26 inches, 30 inches, and 36 inches diameter.

Globe Iron Works, OLDHAM.

Telegrams: HAIGH, OLDHAM.
Telephone: 1273 Oldham.

Haighs (OLDHAM) LTD.



MEERLOO



A.G.S. PARTS

DAY AND NIGHT PRODUCTION.
THE MOST MODERN PLANT IN LONDON.

Immediate Deliveries of
NUTS, A.G.S. 115c. & 115b.

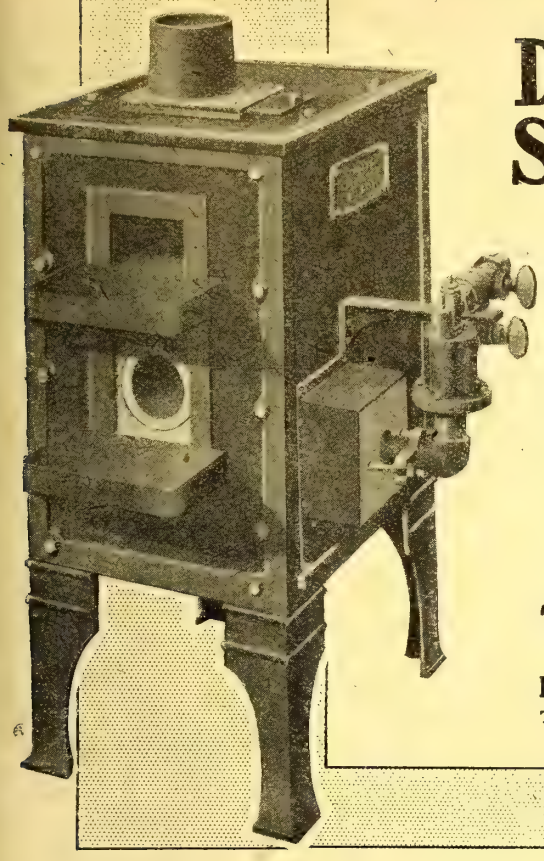
S.B.A.C. The Society of British Aircraft Constructors

THE MEERLOO ENGINEERING CO LTD

'Phone: Stratford 978.
Wires: Aeromeecol, 'Phone, London.

AERONAUTICAL ENGINEERS,
CONTRACTORS TO THE AIR BOARD
EASTERN WORKS, FOREST LANE,
STRATFORD, LONDON, E.15.
Managing Director: JOHN MEERLOO, Jun.





Davis High-Speed Steel Furnaces

The Davis "D.H.S.T." series of Gas-fired Furnaces have been specially designed for the hardening of modern High-Speed Steel Tools, and to provide the maximum of convenience and efficiency at the least practicable fuel cost.

The firing element consists of Davis PATENT Air-Blast Burners, for gas at ordinary main pressure and air at 2 lbs. per sq. inch. Two chambers are provided, each fitted with stopper brick, a pre-heating temperature of 1,000 deg. C. being attainable in the upper chamber, and 1,350 deg. C. in the lower; whilst the flame does not impinge on the work.

Illustration shows the No. 50 size (top chamber 10 in. by 4 in. by 2 in.; lower chamber with silica tube, 9 in. by 2¼ in. inside diameter). Price **£16 6s. 6d.** complete. Write for Lists F18 A, B and C (gratis).

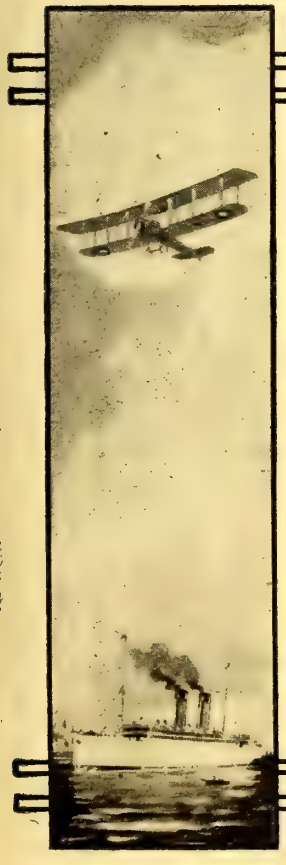
Also Ovens, Muffles, Crucibles, Lead Melters, etc.

THE DAVIS FURNACE COMPANY

(Proprietors: The Davis Gas Stove Co., Ltd.)

Dept. Q, The Diamond Foundry, Luton, Beds

Telegrams: "Castings, Luton." Telephone: Luton 260



Allen's STEELS for AIRCRAFT AND MOTOR CAR CONSTRUCTION

Mechanical Tests.

As furnaces and pyrometers vary considerably, the best results will be obtained by taking the figures in our

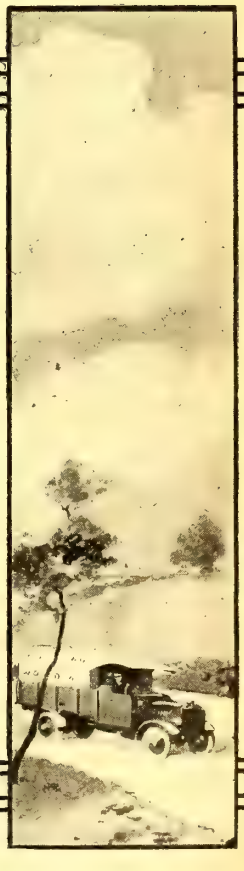
Catalogue D. (Post Free on Request)

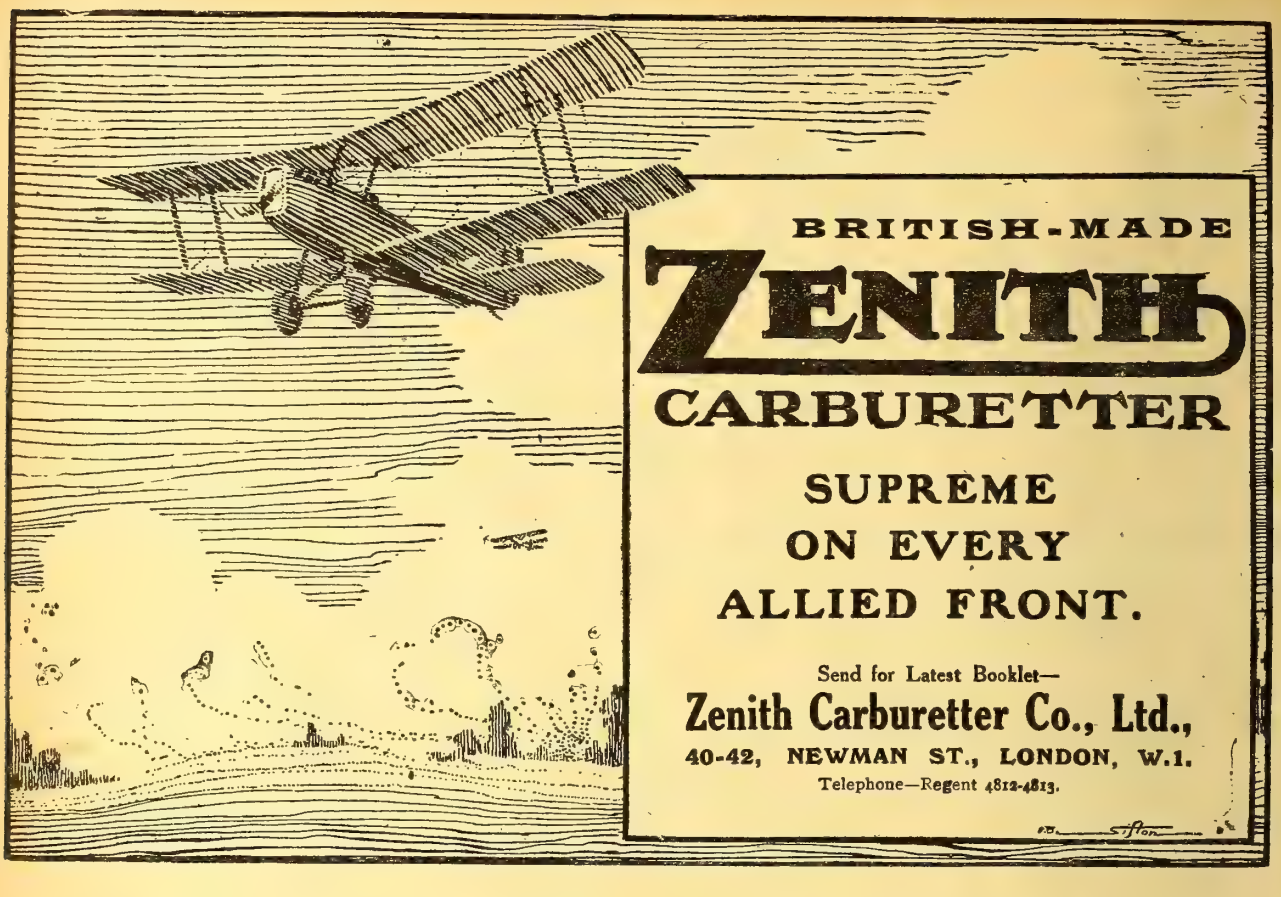
as a guide, treating a few test pieces to arrive at the most satisfactory heats for the particular purpose required.

In case of uncertainty, write for the advice of our Research Laboratory.

Edgar Allen & Co. Ltd.

Imperial Steel Works, Sheffield.





BRITISH-MADE

ZENITH

CARBURETTER

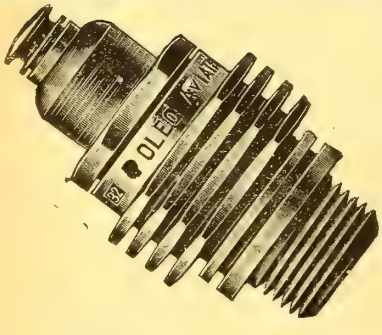
SUPREME
ON EVERY
ALLIED FRONT.

Send for Latest Booklet—

Zenith Carburetter Co., Ltd.,

40-42, NEWMAN ST., LONDON, W.1.

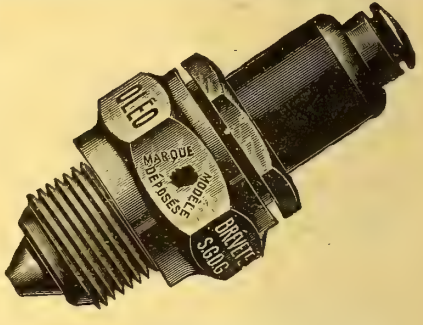
Telephone—Regent 4812-4813.



TYPE No. 32.



"The Smile of Success."



TYPE No. 27G.

OLEO were the first Aero Plugs ever made.
OLEO won the Aero Grand Prix SIX TIMES in succession.
OLEO Plugs have been supplied to the Government since 1913.
OLEO Aero Plugs have the "Largest Sale in the World."
OLEO Plugs have won over £30,000 in prizes.
OLEO Plugs were the first to Loop the Loop.
OLEO Plugs were the first to Cross the Alps.
OLEO Plugs are supplied to NINE Governments.

OLEO PLUGS

LEO RIPAULT & Co.
64a POLAND ST. LONDON, W.
TELEGRAMS RIPAULT REG. LONDON. TELEPHONE GERRARD 7758



Fig. 29.

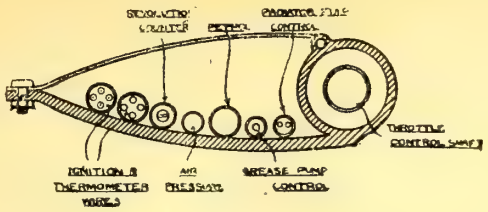


Fig. 30.

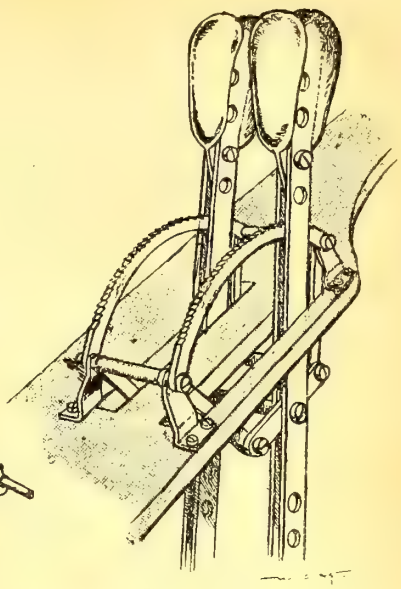


Fig. 31.

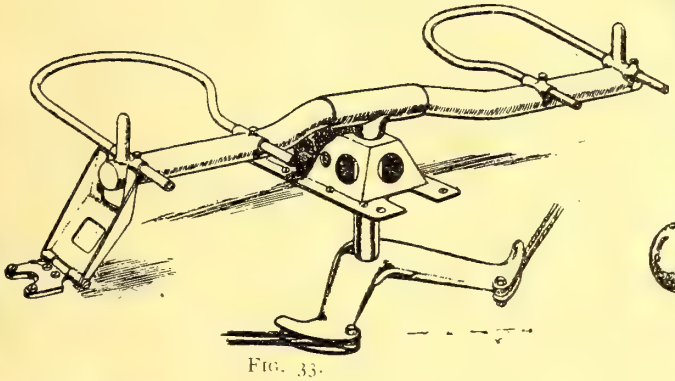


Fig. 33.

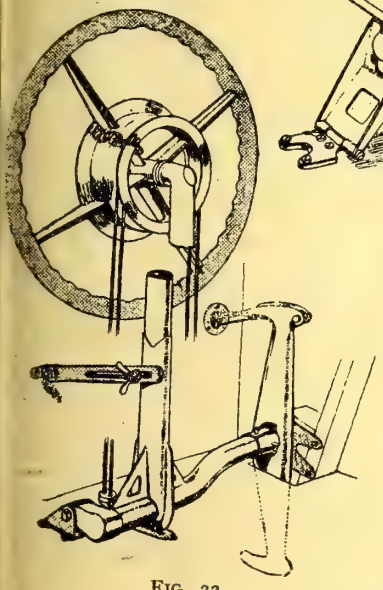


Fig. 32.

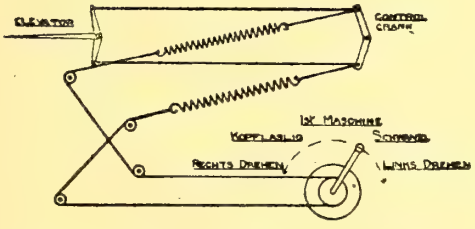


Fig. 34.

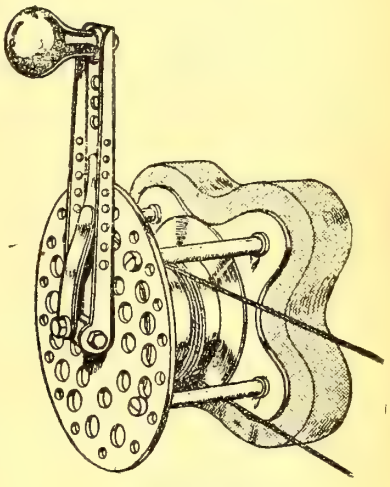


Fig. 35.

(*Continued from page* 1710.)

seat and the other at the top rear end of the nacelle, contain 270 litres = 59½ gallons each, and are made of brass. Each is provided with a Maximall level indicator, which employs the principle of a float operating a dial by means of a cable enclosed in a system of pipes.

A hand pump is fitted convenient to the pilot, and pressure is normally provided by the pumps installed in each engine. An auxiliary tank, holding approximately 13 gallons, is concealed in the upper main plane, not immediately over the nacelle but a little to the left side. This auxiliary tank is fitted with a level, as shown in Fig. 29, which is visible from the cockpit. The auxiliary tank appears to be used only for starting purposes. It is covered with a sheet of fabric held in position by "patent fasteners."

Engine Controls.

Running from each engine to the nacelle is a horizontal streamline casing, containing the various engine controls. A section showing the arrangement of these inside the fairing is given in the sketch, Fig. 30. The leading edge of the streamline casing consists of a steel tube, to which are welded narrow steel strip brackets, to the rear end of which are bolted thinner strips which are hinged in front to the tube. The whole is then enclosed in a sheet aluminium fairing.

Through the leading tube passes the throttle control rod for each engine, the two throttles being worked either together or independently by the ratchet levers, shown in Fig. 31. These are mounted on a shelf convenient to the pilot's left hand. This control requires a considerable number of bell cranks and countershafts, but was noticeably free from backlash. The throttle is opened by the pilot pulling the levers towards him.

On the dashboard are two revolution counters and two air pressure indicators. The metal parts of these dials are painted red for the left engine and green for the right, and the same colouring applies to the magneto switches, one of which contains a master switch which applies to both magnetos on both engines.

Piping.

The various systems of piping are distinguished by being painted different colours, thus the petrol pipes are white, arrows being also painted on them to show the direction of flow; air pressure pipes are blue, and pipes for cable controls grey.

Propeller.

The propellers are made by the Luckenwaide Propellerwerke, Niendorf. Each propeller is 3.08 metres in diameter and is made of nine laminations, which are alternatively walnut and ash, except one which appears to be of maple. The propeller has the last 20 ins. of its blade edged with brass. The pitch is approximately 1.8 metres and the maximum width of the blade 220 millimetres.

Controls.

Only one set of control gears is fitted, but as pointed out, the seating accommodation is so arranged that any of the crew can take charge if, and when, necessary.

The elevator and aileron control is shown in sketch Fig. 32. It consists of a tubular steel pillar mounted on a cranked cross bar at its foot. The ailerons are worked by cables passing over a drum on the wheel, whence they descend through fibre guides on the cross bar to another wheel mounted on a countershaft below, from which they are taken along inside the leading edge of the lower wing and finally over pulleys up to the aileron levers on the top plane. The latter are partially concealed in slots let into the trailing edge of the wing. The upper and lower ailerons are connected by means of pin jointed tubular steel struts of streamline section.

It will be observed from Fig. 32 that a locking device whereby the elevator control can be fixed in any desired position is fitted, and consists of a slotted link which can be clamped by a butterfly nut to the control lever. This link is hinged to a small bracket attached to the panel below the pilot's seat.

Fig. 33 shows the rudder control, from which cables are taken over pulleys and through housings in the nacelle and finally to the end of the fuselage. The cranked rudder bar is of light steel tube and is arranged to be placed in the pivot box in either of two positions. It is furnished with light steel tubular hoops which act as heel rests and are adjustable. A locking clip is fitted on the floor of the cockpit so that the rudder can be fixed in its neutral position.

A novel type of trimming gear is an interesting item of the

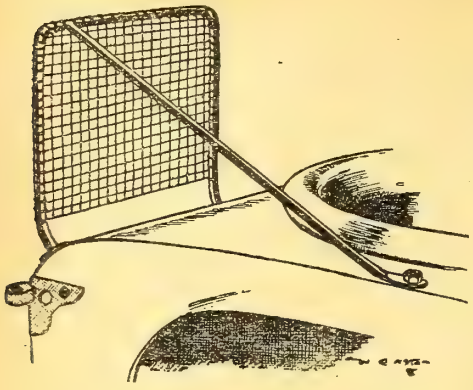


Fig. 36.

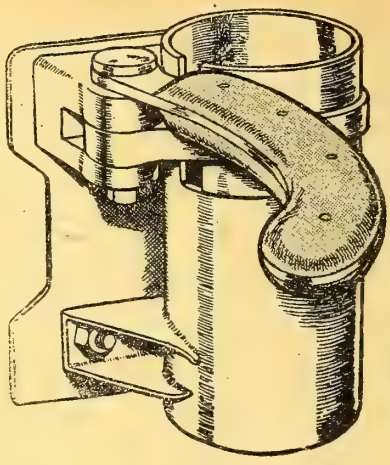


Fig. 37.

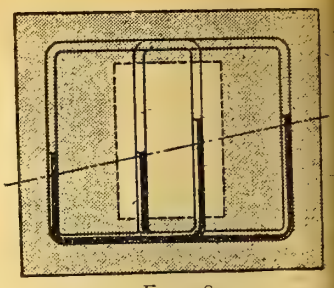


Fig. 38.

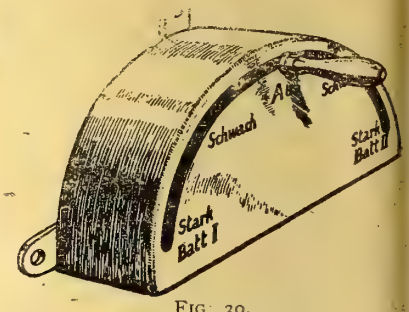


Fig. 39.

control. Movement of the elevator control from the normal upright position of the stick is made against the tension of one of two springs which can be alternately extended and relaxed by means of a winch connected to them, as shown in the diagram, Fig. 34. Normally these springs tend to bring the control stick back to a central position, in which the elevator lies flat, but if one of the springs is tensioned by winding up the winch in clockwise direction, the position to which the stick will tend to come when released will be such as to set the elevator at a positive angle. This winch gear, which is illustrated in Fig. 35, is mounted on the right-hand side of the nacelle, and is therefore under the command of the pilot's companion.

The crank is furnished with a locking pawl, which engages with a ring of small holes bored in the plate of the winch. The steel springs used in conjunction with this apparatus are some 3 ft. long and about ¾ in. in diameter. The inscription behind the winch reads :—

Nose heavy—Right wind.
Tail heavy—Left wind.

Landing Gear.

As might be expected, the landing gear on this machine is of massive proportions. Two vertical streamline section wood-filled tubes descend from the centre section wing spars, immediately under the engine, to a bridge piece or hollow girder made of welded steel. Through an oval hole in this girder a short axle carries two 965 mms. × 150 mms. wheels (38 in. × 6 in.) These work up and down against the tension of a bundle of steel springs about ½in. in diameter and made of wire approximately 1-16in. thick.

The steel girder is extensively pierced for lightness, and the edges of the holes are swaged inwards. The axle is prevented from moving sideways by plates, and is provided with short steel cables which act as radius rods and connect it to the front of the girder. The whole of the box girder is covered in with a detachable bag of fabric, which extends up to the small cross bar mounted immediately above the girder.

Mudguards are provided behind each landing wheel for the purpose of preventing any mud or stones dislodged by the wheels from coming in contact with the propellers.

From the front and rear of the box girder streamline tubes are taken to the ends of the main wing spars, where they abut against the nacelle, and these diagonals are further braced with streamline steel tubes. Both the vertical and diagonal tubes are held in split sockets so as to be easily replaceable if damaged.

In addition to the four main landing wheels, a fifth is mounted under the nose of the fuselage. This wheel is 760 mms. × 100 mms. (30in. × 4in.) It is mounted on a short axle, which is capable of sliding up and down slots in its forks against a strong coil spring, and it is also capable of a certain amount of lateral movement along its axle, also against the action of two small coil springs.

The tail portion of the fuselage is protected by a fixed skid made of wood but shod with a steel sole. This is fitted with a small coil spring contained inside the fuselage.

Wiring.

The whole of the wiring system on the machine is very neatly carried out. There are three main systems; firstly, the ignition wiring, which is contained for the most part in tubes of glazed and woven fabric; secondly, the heating system, for which the wires are carried in flexible metal conduits; and, thirdly, the lighting system, in which a thin celluloid protective tubing is used. Wires are run from the nacelle along the leading edge of the upper planes to points level with the outermost strut. Here they terminate in a plug fitting placed behind a hinged panel. Apparently lamps are intended to be served by this circuit. Immediately in front of the pilot's seat a universally jointed lamp bracket is mounted on the outside of the nacelle. The exact purpose of this lamp is not known, as it could not illuminate any instruments.

Armament.

Both the forward and rear cockpits are furnished with swivel gun mounts carrying Parabellum machine guns. These mounts consist of built-up laminated wood turntables working on small rollers, and carry a U-shaped tubular arm for elevation. This arm is hinged to a plunger rod working through a cross head and arranged so that the arm is normally pulled down flat on the turntable by a coil spring. The plunger can be locked in any of a series of positions by means of a bolt operated by a hand-lever through a Bowden wire. A second lever allows the turntable to be locked at any desired point. A perforated sheet-metal shield protects the cross head and spring. Small shoulder pads are fixed on the turntables, of which that in the forward cockpit has a diameter of 2ft. 10½in., whilst in the rear the diameter is 3ft. ½in.

The after-gunner is prevented from damaging the propeller by two wire netting screens, supported by tubular steel brackets placed on either side of his cockpit. These are sketched in Fig. 36.

In addition to these two guns, provision is made for mounting a third in front of, and to the right of, the pilot's cockpit, where it could be managed by his companion. For this purpose a clip is provided immediately under the coaming of the nacelle, and the handle of this protrudes through a slot in the dashboard. The clip works on the eccentric principle, and appears to be self-locking. Its construction is shown in detail in Fig. 37.

A rack for Verey lights is mounted on the outside of the nacelle convenient to the pilot's companion.

INSTRUMENTS.

Airspeed Indicator.

Considerable interest attaches to the fact that this Friedrichshafen Bomber is the first enemy machine brought down which has been found provided with an airspeed indicator. This is of the static type, embodying a Pitot head of the usual type. The indicator has a dial of large size, and is altogether a much more bulky instrument than any for a similar purpose used in British machines. An investigation of its mechanism is being made.

Altimeter.

This is of the usual type, reading to 8 kilometres.

Level Indicator.

This is a somewhat crudely made device, employing two liquid levels, as indicated in the diagrammatic sketch Fig. 38. It will be seen that the reading gives the pilot an exaggerated idea of the angle of roll. The glass tubes are sealed up, and contain a dark blue liquid. One side of the dial is engraved Hängt links (Hangs left), the other Hängt rechts (Hangs right). The manufacturer is Arno Weisse, Berlin.

Revolution Counters.

The dials give readings from 300 to 1,600 r.p.m. The section between 1,300 and 1,500 is painted black, and these figures are marked with luminous compound, as also is the indicating hand. The manufacturer is Wilhelm Morell, Leipzig.

Air Pressure Gauges.

These read from 0 to 0.5 kilogrammes per square centimetre.

Firth's
Best Cast Steel
Files.

Apply for Copy of the
New Official Price List.

Thos. Firth & Sons, Lᵗᵈ, Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

There is a red mark against the figure 0.25 kg. The manufacturer is Maximall Apparat Fabrik, Berlin.

Electric Thermometer Dial.

This dashboard instrument consists of a box-type meter, the dial reading from 0 to 100 deg. C. The figures 0 and 75 are accentuated by red marks. A switch at the side of the box, having positions marked 1 and 2, allows the temperature of either radiator to be read.

Petrol Level Indicators.

These are of the Maximall type, and employs a float immersed in a tubular guide in the tank. This float communicates its motion to a finger working over a circular dial, by means of a thin cord passing over pulleys. These are encased in pipes, which are under the same pressure as the tank.

Electric Heating Rheostat.

This is illustrated in Fig. 39. It is marked Aus (off), Schwach (weak), Stark (strong). There are two separate resistance coils, enabling the rheostat also to perform the function of a change-over switch.

Wireless.

The machine is internally wired for wireless, and the left-hand engine is provided with a pulley and clutch for driving the dynamo. Reference to Fig. 22 will show that this is designed to be mounted on a bracket carried by the outside front engine bearer strut, and that the engine fairing is moulded to receive it.

Bombs and Bomb Gear.

At each side of the covered-in passage way in the nacelle are bomb racks capable of holding five 25-pounder (12 kg.) bombs.

Underneath the nacelle are carried two large tubular frames, fitted with cradles of steel cable, and furnished with the usual form of trip gear.

These racks would, it is believed, be capable of supporting a 300 kg. bomb a-piece. The bombs carried, however, evidently vary with the radius of action over which the aeroplane has to operate. The large racks are not permanently attached to the nacelle, but can easily be removed as required.

Inside the front cockpit from which the release of the bombs is conducted, there are seven triggers for the small bomb racks and two levers for the large bomb trips. The cables for this gear are carried under the floor, and are painted different colours for distinction.

Bomb Sight.

The bomb sight carried on the machine presents no new features, and is of the ordinary German non-precision type.

Fabric and Dope.

Two entirely different kinds of fabric are employed in the Friedrichshafen machine. The wings are covered with a low grade linen of the class which is employed on most of the enemy machines. It is white in colour. Compared with that of British fabrics, the tensile strength is fairly good.

This fabric is covered with a cellulose acetate dope, and is camouflaged in large irregular lozenges of dull colours, including blue-black, dark green, and earth colour.

The other fabric, which is applied to the fuselage, tail plane, rudder, elevator, fin, and landing gear, is apparently a cheap material, much inferior to British fabrics designed for a similar purpose. This fuselage fabric is dyed in a regular pattern of lozenges, the colours being hardly distinguishable from black. The dope is acetate of cellulose.

In both cases the dope seems to be carelessly applied.

Changes in Design.

When compared with the Fdh. GIII., No. 177/17 (of 13/9/17, brought down by the French, this Friedrichshafen presents a few differences in detail design, amongst which the following points may be noted:—

(1) Engine fairing. In No. 177 spinners were mounted on the propeller bosses, and an aluminium ring of large diameter mounted on the rear extremities of the engine bearers in order to carry the rearmost fairing panels.

(2) Exhaust pipe. In the No. 177 this was, as in the present case, trumpet shaped and turned back at the end, but instead of a series of slots being used, the open vent was "bottled," i.e. that the orifice was slightly restricted, and an additional circle of small holes provided.

(3) Engine bearers. These were of ash in the No. 575, and the L-shaped extension was not used. The method of building up the bearers was, however, similar to that described.

(4) The weight empty was 2,665 kg. in the No. 177, as against 2,695 in the machine under review.

(5) The air scoops under the engine fairing were smaller.

(6) The arrangement of the instruments, taps, etc., on the dashboard was quite different.

A CRITICISM AND A REPLY.

Sir,—I would head these few notes, "A Plea for the Standardisation of Data," and I think this is a subject which might well receive far more attention than at present, especially with the valuable aid of the technical press. The series of articles by Mr. C. Sylvester, which has commenced in your journal, prompt me to make the following suggestions and criticisms of the methods of authors and others when treating on scientific subjects.

To begin with, data in the centimetre-gramme-second system of weights and measures are often mixed indiscriminately with others in the inch-pound-second system, like dimensions on a sub-contractor's blue-print.

Thus, after giving the specific heats of various metals with evident relation to the English system, and Fahrenheit's scale of temperatures, their melting points are given in degrees Centigrade. And, let it be remembered, that the figure representing specific heat does not denote by which system it was arrived at, being generally a plain decimal. And re Magnalium, why say that its specific heat is "about .2184 degrees Fahr.?" Incidentally, its melting point is given in Fahr., while all the others are in Centigrade.

Again, the language used in these otherwise instructive articles is extremely loose; for example, Mr. Sylvester says: "Heat is sometimes termed temperature . . . that the temperature is more hot or cold, as the case may be."

Now heat is a form of energy, says theory, and the temperature of a body is the amount of heat the body possesses; obviously, then, it cannot become hot or cold.

A little further on he expounds the theory or principle of the efficiency of the transference of heat, giving an example where 60 per cent. of an amount of heat is transferred, but the student is left guessing if he should become acquainted with the Law of Mixtures, which states that "the amount of heat lost by the hotter equals the amount gained by the colder," when speaking of the transference of heat from one body to another.

It is evidently quite a slip when the writer refers to 63 deg. C. as the boiling-point of water, but I think that the graph, Fig. II, might well bear a zero mark, to give some indication of why the curve is shaped as it is.

Such details as these are of little importance when one knows the rudiments of the subject beforehand, but seeing that the articles are intended obviously for the elucidation of the uninitiated, one thinks they are apt to prove confusing.

(Signed) N. Biles.

The Reply.

Sir,—I have read the letter from Mr. Biles, and I think it calls for a little comment from me. Authors are at all times open to criticism, and, as a rule, they welcome criticism of a healthy description; that is, if their critic knows what he is doing.

Mr. Biles appears to take exception to my method of explaining temperature. This is strange, because it is really the most natural thing in the world to say, if one meets a friend in the street, "It is warmer or colder to-day," as the case may be. Perhaps Mr. Biles would have me say, "The temperature is higher, or lower," or it may be that he has a vocabulary of his own concerning temperature.

His criticism of the degrees of temperature are very vague. It appears that he is disappointed that I did not quote the rule for converting Fahrenheit into Centigrade. If this is so, I will quote it for his benefit:—

"To convert Fahrenheit into Centigrade, subtract 32, multiply by 5, and divide by 9."

I really cannot grasp what he means when he states that the curve in my second article is not complete. To my mind, the curve and points are perfectly obvious. So much so that if a small boy of twelve could not be made to understand it in three minutes, there must be something wrong with his understanding faculties.

His statement that no heat units are lost in a transfer of heat is ridiculous to the extreme. Beyond saying that the efficient transfer of heat is the greatest problem of engineers, I leave it to his own sense of reasoning to show him his mistake.

If I can enlighten Mr. Biles on other small points, I shall be happy to do so.

(Signed) C. Sylvester.

LORD DENBIGH AT BLACKBURN'S.

On April 23rd Colonel the Earl of Denbigh, M.V.O., A.D.C., visited the works of the Blackburn Aeroplane and Motor Co., Ltd., and addressed the employees of the firm upon the importance of their work in connection with the war. The speaker lectured on Germany's projects in relation to the Far East and the desire of the enemy to establish a direct route through Serbia to Baghdad.

He thought that people who wanted peace to-day were either lunatics or enemy agents, and in either case the only thing that was good for such people was hanging.

DANISH COMMERCIAL AVIATION.

A Danish aeronautic company has been formed with a share capital of £111,000, with the object of establishing an air route after the war between Copenhagen, Esbjerg, and London, the route to be connected with other Scandinavian air routes.

PULVO

It gives Fritz fits

when our 'Busses drop their little Souvenirs.

It's your Job to supply the complete 'Bus. It's ours to help you to do it.

You make the 'Bus. We make the Gadgets—the little bits and things.

The little Angle Cleat, the more imposing Tail Skid, the Strut Socket, this little bit and that—we make them all. What can we make for you?

We are making new tools for the new De.H. machines and can promise early delivery, and

WHAT PULVO PROMISES PULVO PERFORMS.

The PULVO ENGINEERING Co. Ltd.

10, 12, 14 and 16, DANE STREET, and 95 and 96, HIGH HOLBORN, LONDON, W.C.1.

Telephone: Holborn 410.

Telegrams: Pulvipult, West-Cent.

A Profitable Investment for all MANUFACTURERS OF ENGINE PARTS

or any other work which requires gauging to fine limits

The usefulness of the Prestwich Fluid Gauge is invaluable where repetition work to fine limits is carried out.

This instrument overcomes the difficulties of micrometer and special gauges, and is the quickest and most accurate method of gauging it is possible to use.

The Prestwich Gauge has no wearing parts, and will give unfailing accuracy for years. An error is magnified 1,000 times and is thus easily visible to the eye. Skilled labour is not essential, and readings may be taken to the $\frac{1}{50.000}$ part of 1" at the rate of 60 per minute if necessary.

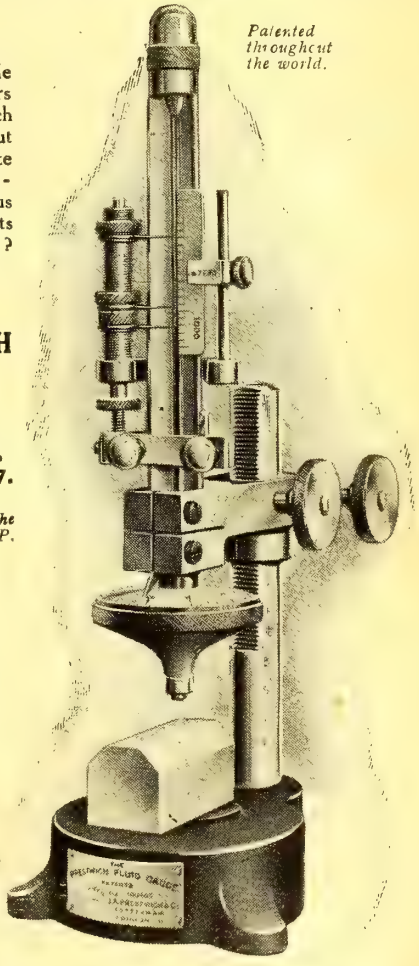
The Prestwich Fluid Gauge

Accuracy to the ten-thousandth part of an inch with ease

The ideal instrument for quickly and accurately gauging all kinds of spindles, rollers, etc., and parts used in Aero Engine Construction.

It is worth your while to obtain full particulars regarding the Prestwich Fluid Gauge without delay! Why not write us to-day for our illustrated booklet and let us know your requirements whatever they may be?

Patented throughout the world.



J. A. PRESTWICH & CO., Northumberland Park, TOTTENHAM, LONDON, N. 17.

Manufacturers of the World-famous J. A. P. Engines.

Agents and Manufacturers for U.S.A. and Canada:—

The Coats Machine Tool Co., 30, Church Street, New York.

Steel Tubes, Tube Manipulation, and Tubular Structures for Aircraft.

A most interesting paper was read before the Aeronautical Society on Thursday, May 2nd, by Messrs. W. W. Hackett and A. G. Hackett, of Accles & Pollock, Ltd., the famous tube manufacturers, of Oldbury, Birmingham.

So interesting was the paper, in fact, that it would be extremely inadvisable to publish the whole of it. Skilful as the Germans are in all classes of metal work, and excellent as is their best steel, such as that from which B.N.D. and Mannesmann is made, some British firms are ahead of them, and one knows Accles and Pollock to be one of those firms.

As the practical man who has perhaps had more to do with the making of A. and P. tubing than anyone else, Mr. W. W. Hackett could teach the most expert German tube makers quite a great deal, and his lecture on Thursday certainly taught his audience much which they hardly ever suspected concerning the manipulation of tubing and its possibilities. One therefore publishes only such parts of the paper as are of interest, but cannot give away information to the enemy.

Mr. W. W. Hackett, who delivered the first part of the lecture, said:—

Independent altogether of the stimulus given to the use of tubing for structural work by the advent and advance of aeronautics, the uses to which tubing of steel and other metals is put has increased considerably during the past few years. Much, of course, has been due to the large output of cycles and motor-cycles, but in addition an immense quantity of tubing is used in the construction of motor-cars, and in a thousand other productions which it is unnecessary to particularise in this paper. The section of tubular work in which we are more especially interested at the moment, however, is that which has relation to aircraft construction, and in this paper we hope to deal with some of the main features of this important subject, giving a brief review of the method of manufacture generally employed, of some of the difficulties that have had to be overcome, and of some of the forms of manipulations which it is possible to put upon good quality steel tubing. The latter part of the paper will deal with tests carried out on specimen tubes, under various conditions, and jointed together in different ways. All that we have to say will apply to seamless steel tubing.

In dealing with such a subject as this other articles must be brought under review, such, for instance, as lugs and liners, as these enter so largely into the construction of articles built mainly of steel tubing. Mention will be made of cycle and motor-cycle experience in the use and abuse of steel tubing.

Seamless Steel Tubing.

Seamless steel tubing is a product of modern times, some 35 years having passed since the first experiment was successfully carried through. Its commercial production has often made possible the manufacture of articles which could not otherwise have been made, and in other cases it has been the means of popularising articles which were having a very small sale, and which were even looked upon as freaks.

Many present will remember the old bicycles which were built of gas pipes and solid pieces of iron, and will have recollections of the energy taken to propel these machines, especially up an incline! The coming of seamless steel tubing soon altered that, and a few years later cycle frames were being built of light gauge tubing, enabling a man to propel himself at 10 to 20 miles an hour on a structure weighing about 30 lbs. Two things made the cycle a commercial success: pneumatic tyres, which made riding more comfortable, and light gauge steel tubing, which brought down the weight of the cycle to a minimum. A further word must be said for the pneumatic tyres, namely, that by minimising the shock to the frame they made possible the introduction of lighter gauge tubes than could otherwise have been safely used.

How Seamless Steel Tubing is Made.

To commence the manufacture of a seamless tube a solid billet of steel, well hammered and rolled, is taken. This billet must be carefully examined for various faults, and any lamination or surface defect removed by chipping, or else the outside of the billet must be turned all over. The usual practice when the latter is done is to turn about $\frac{3}{32}$ in. off the diameter of the billet.

The first operation is then to pierce a hole. Two ways of doing this are in general use; one is by means of a hydraulic press, similar to the method of piercing shells so common in this country to-day, and the other by means of a rotary piercing machine. The billet, first centred with large shallow holes, is heated to about 1,200 deg. C. and fed between rolls having a curved outline and set at an angle which imparts a forward movement to the billet as it is rotated. Great pressure is used (which causes the billet to tend to open along its axis), and the billet is forced against and over a pointed mandril held on the end of a stout rod, which butts against a bracket at a distance of about 7ft. from the centre of the rolls.

A billet, 4ins. diameter by 24ins. in length, will be made in one operation into a tube about 4ft. to 5ft. long. The pierced billet is then taken to another machine which is provided with upper and lower rolls having semi-circular grooves of various radii, and by a series of operations is rolled into a tube of the required size. The tube is passed over mandrils to give the required thickness.

A much quicker process of rolling mild steel tubes is by means of Pilgré rolls; but for high carbon steel or chrome nickel steel this process has been found to be unsuitable.

Cold Drawing.

The first operation in the cold-drawing mills is that of "tagging"; the hollow bloom (as the rough rolled tube is called) being reduced at one end by suitable semi-circular tools in a power-forging hammer. The tube in the drawing operations to follow will be pulled through the dies by means of the "tag" thus formed. A small hole is also put into the tube at the point where the tag commences, in order to allow acid and water to work through the tube in the subsequent pickling and swilling processes.

After being "tagged" the tube is annealed, pickled in a bath of acid to remove the scale, and then swilled in clean water. Following this, the tube is dried and then immersed in a solution of soap, or in oil, to lubricate it for the drawing operation. It is now ready for drawing.

There are two methods of cold drawing in general use. One is by drawing down the outside diameter of the tube upon a long bar of uniform diameter and then passing the tube, while on the bar, through rolls fixed in a "reeling" machine, which is similar to that used in the rotary piercing operation. In carrying out this method the tube is put on to the bar, which must of necessity be smaller than the bore of the tube to be drawn. The tube and the bar are then pulled through a die of hardened steel of such a bore as will give the proper reduction of gauge to the tube.

The tube is gripped on the "tag" by means of "dog" jaws sliding on inclined planes. The "dog" is moved along the draw-bench by hooks which are dropped into the links of an endless chain. The chains move at a speed of from 12ft. to 35ft. per minute, according to the class of material to be drawn. This process of cold drawing permits of a greater reduction of thickness at each draw than can be obtained by the more usual process of "plug" drawing, but is rather harsh on the material, and the expanding of the tubing (already hardened by drawing) to allow the mandril to be extracted sometimes causes splits and fractures. These are more likely to appear if this process is used after the tube has been drawn to a light gauge.

The second method is that known as "plug drawing," and is more usually adopted; in this case a short, hardened mandril is screwed into one end of a long bar. This bar is screwed at the other end into a larger piece of steel known as the "back sleeve," which is screwed and fitted with a nut at either end. This sleeve has an axial movement of about 9ins. in the back casting of the draw-bench. The nut at the back is used for the purpose of adjusting the position of the mandril in relation to the die.

The tube is threaded over the mandril and the "tag" is passed through the die, which rests against the die plate. Immediately the "tag" is gripped by the "dog" it commences to move, the mandril at the same time being drawn forward into position by means of a rope or chain. A reduction in gauge thickness and diameter, with an increase in length, is the result, due to the walls of the tube being drawn down between the mandril and the die.

The usual reduction by this method is about a gauge and a half per draw on low carbon steel. The operation of cold drawing hardens the tube to quite a large extent, and subsequent annealing is necessary.

Annealing.

A properly annealed tube showing an ultimate tensile stress of about 30 tons per square inch should give about 38 tons after undergoing the drawing operation. Properly to prepare the tube for further cold drawing it is therefore necessary to anneal after every drawing operation, which means it has also to be pickled, washed, dried, and lubricated. A hollow bloom $1\frac{7}{8}$ in. diameter by 8 in. gauge would require nine or ten "draws" to make it into a tube $1\frac{1}{4}$ in. by 22 in. gauge. The annealing is carried out in suitable muffles, usually at a temperature of about 600 deg. to 650 deg. C., until before the last "draw," when a temperature of about 850 deg. C. is advisable. In the case of light gauge tubes, this should be done by "close" annealing, as the scaling and blistering of a light tube by "open" annealing would be fatal.

When a tube has been drawn to about 7/16 in. diameter there is great difficulty experienced in drawing on a mandril. The usual practice is to finish $\frac{3}{8}$ in. diameter tubes and smaller by reducing the diameter only. This is termed "sinking." The



ARMSTRONG, WHITWORTH
AIRCRAFT WORKS,
NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE,

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

"GWYNNE, LONDON."

condition of the tube finished in this way is not so good as when finished on a mandril, the strength of the tube being less. From experiments made, tubes from .5 per cent. carbon steel finished by "sinking" show about the same tensile strength as tubes from .35 per cent. carbon steel finished with the usual "draw" on a mandril.

Chrome Nickel Tubes.

The advent of aeroplanes and airships has given rise to a demand for steel tubing of a higher class than before, tubes of high carbon and alloy steels being called for. This has meant careful investigation in order to find the best heat treatment to be accorded in each particular case. The first attempts at drawing chrome nickel steel were scarcely a success, and many breakages of mandrils and even draw-benches resulted from the unsatisfactory annealing of these tubes. Chrome nickel tubes are now being successfully drawn by the same methods as are used for mild steel tubing—by means of "plug drawing"—but very great care needs to be taken in the annealing.

The amount of reduction in gauge per draw is less than half that which is usual in the drawing of mild steel, but in spite of this the wear on mandrils and dies is very great.

A typical analysis of chrome nickel steel is as follows:—

Carbon	.3	per cent.
Silicon	.16	,,
Sulphur	.03	,,
Phosphorus	.03	,,
Manganese	.45	,,
Chromium	1.10	,,
Nickel	4.00	,,

Such a steel, when air-hardened, has an ultimate tensile stress of about 100 tons, but a low elastic limit to a maximum value of about 70 tons. Tempering will raise the yield point, and, at the same time, slightly reduce the ultimate stress. This steel is being much used for aeroplane axles.

One feature that should be mentioned here is the very serious effect of sulphuric or muriatic acid on hardened chrome nickel steel tubing. It has the effect of making the material exceedingly brittle. It is therefore inadvisable to use acid to remove scale from a hardened chrome nickel steel tube; but the injurious effect of the acid can be almost entirely removed by suitable heat treatment.

Acid affects other high tensile steels in the same way, but to a less degree, and has a considerable effect even on mild steel.

Section Tubing.

Section tubing has been extensively called for by aeroplane designers, and streamline tubing is used to quite a large extent. The first streamline tube our Company (Accles & Pollock, Limited) were asked to make was designed by Mr. Howard T. Wright in 1908, and is a section that is very near to the recognised standard of to-day. Section tubing, the streamline-shaped tube especially, is much easier to make if straight sides are avoided, as straight or concave sides compel the use of mandrils and add to the difficulty of production. There are three ways of making sections from seamless tubing, namely, by drawing, rolling and pressing. Pressing is only practicable on fairly short lengths. In drawing there is a slight reduction in periphery in passing from the round, but in rolling or pressing it remains the same.

Some Difficulties Overcome.

It will be useful in this paper to review some of the trouble we have met with in connection with other trades where tubing has been used to a great extent, and to mention some of the failures, as the same or similar faults may occur in aeroplane construction. When the Bowden brake was first used on cycles and motor-cycles the practice followed was to drill the tube near the handlebar lug to allow the cable to pass through, and this resulted in a large number of breakages. This difficulty was overcome by drilling the holes through the lugs; but many accidents occurred before this practice was adopted.

Under an alternating stress a tube which has been drilled, unless properly reinforced, is very likely to fail. A series of running tests on drilled and undrilled tubes has shown that when stressed up to near its elastic limit the undrilled tube has in many cases 10 to 20 times the life of the drilled tube. It is often the case that the harder the tube the greater the risk of breakage through a hole. One way of breaking a hard-drawn tube, adopted in tube mills, is either to "nick" the tube on one side with a file or to punch a hole in one side and then break by striking the tube on a block or anvil.

Quite recently we have carried out a large number of important tests on a special type of alternating stress testing machine which we had built. This machine, together with many of the tests carried out and the results achieved, was to a great extent due to the enthusiasm and foresight of Lieutenant-Commander H. N. Wylie, R.N.V.R., and Lieutenant R. W. Fieldwick, the Resident A.I.D. Inspector at our works, to whom we wish to express our thanks for help given.

Badly Designed Cycle Lugs.

Another series of failures was caused by unsuitable lugs. Some of those used in the earlier days of motor-cycling had very strong outlets, and case after case of tube failure occurred. The tubing sometimes broke off so cleanly as to give the appearance of having been cut through. The broken tubing could be flattened, thus proving it was ductile and in a proper condition for its purpose.

In order to prove that the fault lay in the excessive strength of the lugs, a series of experiments was carried out a number of years ago. A lug, as generally used, was tapered off at one outlet and left strong at the other. A piece of tubing of the usual gauge and quality was brazed into the lug and the lug firmly secured to a plate. The ends of the two tubes were then moved by eccentrics and connecting rods giving a ¼ in. movement at a speed of about 400 alternations per minute. Each time the experiment was tried the tube broke off cleanly close to the thick outlet, whereas the tube at the tapered outlet remained intact.

[Obviously the tapered lug-end gave a certain amount of spring, and so did not provide a dead rigid fulcrum against which the tube could break. Also, one imagines that a heavy, strong lug contracts onto the tube in cooling after brazing and affects the composition of the tube immediately at its junction with the lug. Furthermore, tubes are almost always weakened after brazing by careless filing—in removing spelter and flux and scale—just outside the lug, where they ought to be strongest. —C.G.G.]

In these tests two types of grips were used, one tapered and one not, and two points were proved, namely, the beneficial effects of "blueing" and the increase in the life of a tube when held by a grip having a tapered outlet. Another interesting feature of the test was the spiral form of the break.

Another interesting test was as follows:—After brazing the tube into a lug with respectively thick and tapered outlets similar weights were applied to the ends. The tube in the tapered outlet bent with an easy curve, but that at the other end bent abruptly close to the thick outlet.

Front Forks for Cycles.

It has been proved to the satisfaction of many cycle and motor-cycle engineers that to keep on merely increasing the gauge of a tube that appears to be too weak for its work is not always good practice. For instance, take the case of the front fork tube as used on the ordinary cycle. This tube has proved of ample strength for use on the excellent highways of this country, but for Continental roads something better was wanted.

Some years ago we supplied a large quantity of front forks produced from 19-gauge tubes to Russian cycle manufacturers. We were asked to increase the thickness to 18-gauge, on account of a number of breakages occurring. We did so, but matters were not improved, and we were then requested to further increase to 17-gauge. There was still no improvement; indeed, the number of breakages increased. The forks all broke off where they were brazed into the crown, and we were asked by the Russian manufacturers to help them out of their trouble. One way of doing this would have been by using a suitable liner or sleeve, but we tried another method, which proved quite successful. We brought back the gauge of the tubes to 19 where brazed into the crowns and tapered the gauge to 22 at the bottom ends.

This proved effective; a lighter article by about 40 per cent., from the same quality steel, thus standing the strain successfully. This result is accounted for by the fact that the shock was more equally distributed along the tubing, due to the strength being reduced, gradually, away from the brazed portion, whereas in the plain gauge tubing the whole of the movement was concentrated in a very small space near the crowns.

[Where, as already mentioned, it was weakened by heating and cooling in brazing, and by filing afterwards. By lightening the gauge towards the tips, the makers simply produced the effect of a fishing-rod.—C.G.G.]

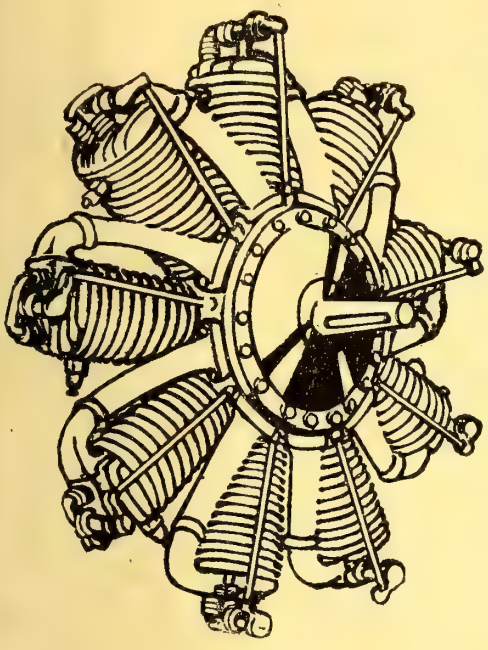
Tapered Tubes.

Tapered tubes could, in our opinion, be used in aeroplane construction to a much greater extent than at present, especially as struts or spars.

Alternating tests as follows were carried out at 400 revolutions per minute on 1 in. by 20-gauge steel tubing, using two parallel lengths and two pieces tapered ½ in. per foot. A weight of 111.56 lbs. was suspended on each tube at a distance of 12⅝ in. from the grips, giving 25 tons stress. The plain pieces broke after 20,585 and 30,390 revolutions respectively, as against 23,557 and 38,225 revolutions respectively by the tapered pieces. The weight of the plain tubes was 6¾ ozs. each, and that of the tapered tubes 6¼ ozs. each. In both cases the break on the plain tubes was straighter than on the tapered one.

[One would like to see some tests done at 1,200 to 1,800 revs. per min.—C.G.G.]

There are several ways in which to taper a tube. A method much in use is that of swaging, but this is a most unsatisfactory way, as the tube is not kept round whilst being reduced. Swaging tools cannot be quite circular, as a certain amount of "backing off" must be given to them, or the tube will be pinched and crumpled. The continued deforming of the tube during this operation causes it to split if it is much reduced, and the steel is left brittle. Tapering is more successful if done on rolls, as it is then possible to keep the tube round, and the steel is left in a much better condition. In reducing the tube by tapering it is



F. W. BERWICK & Co, Ltd.

AEROPLANE & AERO ENGINE MANUFACTURERS TO THE AIR COUNCIL.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

PARK ROYAL :: LONDON, N.W. 10.

Telephone: Willesden 2490 (5 lines). Telegrams: "Berworks, Harles, London."

Proprietors and Manufacturers of Sizaire-Berwick Cars.



AERO ENGINES

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

W. H. ALLEN, SON & CO. LTD.

QUEEN'S ENGINEERING WORKS, BEDFORD, ENGLAND.

thickened in gauge roughly by about two gauges in a reduction of 50 per cent. of its diameter. A tube of 1⅛ in. by, 20-gauge would thicken to 18-gauge if tapered down to 9/16 in. diameter. If uniformity of gauge be aimed at, it would be necessary to thin the tubing before the tapering operation. This can be done by drawing. It is even possible to make a tube tapering both in diameter and thickness if such is required.

Tubular Liners or Reinforcements.

Considerable attention has been given to the matter of liners as reinforcements to tubes. In cases of trapped or flattened ends of struts a piece of strip steel is often inserted and soldered or riveted into position. This is not good practice, as the tube is not strengthened beyond the point at which it is flattened, and it is well known that, without some additional strengthening, a tube is always weakest at the point where the change of shape begins.

If, before flattening, a tubular liner of a gauge equal to about half the thickness of the piece of strip steel is inserted to extend some distance beyond the trapped portion, a much better result is obtained. Various compression tests have been carried out from time to time, and the tubular liner has always proved to be superior.

A liner, however, to be really efficient, should be brazed or soldered to the tube. A series of alternating stress tests has proved this point. Many liners used in tubular constructional work are not fixed, and consequently do not prevent the tube breaking, but may be sufficient to avoid accidents resulting from such breakages. Take, for instance, a front fork tube on a motor-cycle. The liner, often a long one, is put in because this tube has frequently failed at the lugs, and serious accidents have occurred, but the position of the liner in the fork makes it very difficult to solder or braze in its place. However, if a fork tube should break, the liner will save the situation.

It is not wise to make a liner stronger than the tube it is to reinforce unless the ends of the liner are tapered off gradually or weakened by serrations. When the ends are serrated and the liner is not brazed or soldered into the tube, this serrated portion is seldom of any value, as it quickly takes a "set" away from the tube when it has been subjected to a bending stress.

Perhaps the better way to reinforce tubular parts is by means of strengthening "sleeves" brazed or soldered to the outside of the tube. Although in appearance not so neat as when an internal liner is used, there is the certainty of being able properly to fix the sleeve in position.

A tube 1 in. by 20-gauge in which a hole had been drilled was reinforced by a sleeve (in halves) 2½ in. long by 18-gauge thick, pressed into position over the hole by the grips of the chuck which held it. This tube was subjected to an alternating stress test at 400 revolutions per minute. The sleeve expanded at the ends under the test and gradually became so "bell-mouthed" as to be of little practical use. The tubes fractured across the hole at 9,320 revolutions. Another tube cut from the same length and similar in all respects had the sleeve soldered in position. This tube did not break until after 43,867 revolutions had been made, and then it failed between the sleeve and the grips.

Another piece of tubing, also from the same length, having a plain hole drilled through and not reinforced at all, failed across the hole after 3,684 revolutions.

The following is a tabulation of the results just described:—

Sleeve pressed on only	9,320 revs.
Sleeve soldered on	43,867 ,,
Without sleeve	3,684 ,,

These tests point to the fact that a sleeve merely pressed into position has little value, but that when fixed to the tube by soldering or similar means it acts as an efficient reinforcement.

Three types of reinforced tubes were then shown by Mr. Hackett. All these are familiar to readers of the cycle, motor, and aeronautical papers for the past nine years or more. Mr. Hackett continued:—No. 1 is formed by drawing a round tube over two "D" section tubes. The tubes are firmly fixed together by drawing, but are not brazed or soldered. These combinations were designed to take the place of butted tubes in motor-cycle frames, which were failing through excessive vibration. Tests made on a shock-testing machine proved that this form of tubing had a much longer life under shock and vibration than plain tubing of the same weight. When a fracture occurred under test, which was always after a greater number of blows than the plain tube would sustain, it was only the outer member that was affected, the two "D" tubes being quite sound.

No. 2 is a triangular reinforcement formed by drawing an outer tube over three other tubes of the shape indicated in the sketch.

No. 3 has a cruciform reinforcement formed by four inner tubes.

A number of tests were carried out at the time on laminated tubes, formed by drawing one light tube over another, to take the place of a tube of the same weight as the two combined. Under the few tests made the laminated tubes withstood vibration and shock much better than the plain heavy-gauge tube. The only reason we can assign for this is that cold drawing hardens the outside of the walls of the tube more than the centre if the tube is a thick one, and by drawing together the two thin tubes to give the same thickness of wall the metal has the benefit of the double drawing operation. Further tests are necessary to prove or disprove this point.

(To be continued.)



The King and Queen escorted round his works by Major Gordon Watney.

A ROYAL VISIT.

The King and Queen, accompanied by Princess Mary, on April 26th, visited the works of Messrs. Gordon Watney and Company, which, since the war began, have been engaged almost exclusively in the manufacture and repair of aeroplane engines. At the works they were received by Major H. G. Watney, the managing director, who presented the Hon. H. Cavendish Butler, chairman; Mr. C. R. C. Petley, Lt. B. W. A. Watney, general manager; Mr. J. W. Dews, chief engineer; Mr. C. Tankerville Chamberlaine, assistant general manager; Mr. B. Zillwood, works manager; and Mrs. G. W. Goary, the matron. Lt.-Colonel I. B. Davson, Mr. A. B. Chorlton, and Lt. P. Swain, R.N.V.R., represented the Ministry of Munitions and the Air Ministry.

The King and Queen displayed great interest in the works and particularly in the workers, to many of whom they talked in the course of their tour.

Among the departments visited were a number of machine shops, fitting shops, assembling departments, and packing departments. Engines in various stages of completion were examined and a large number of completed engines in store. Practical demonstration was given of the power of 80 h.p., 100 h.p., 130 h.p., and 160 h.p. engines, seven of which were shown running on the test stand.

As the Royal visitors came out of this department a completed aeroplane was making a test flight only about 300 ft. above their heads, and the pilot gave a marvellous exhibition of skill.

The canteen was visited, and in all the departments a cordial welcome was given to the King, Queen and Princess. In the shops where men were employed the demonstration usually took the form of hammering upon the benches as the Royal visitors were leaving. On leaving the Royal party expressed the pleasure and interest they had found in their visit.

CANNONS' (LINCOLN) AEROPLANE GLUES

"IL PROPELLER" (Cake Glue)
FOR PROPELLERS.

"AERIAL" (Cake Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

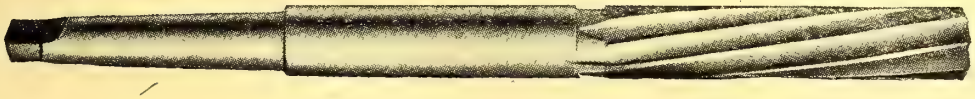
"XL" MIXTURE (Jelly Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

"BI" (Cake Glue)
FOR CLASS 2 WORK.

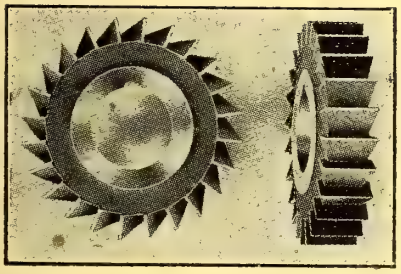
SOLE MANUFACTURERS:

B. CANNON & CO., LTD., LINCOLN.

HIGH-SPEED STEEL MACHINE REAMERS



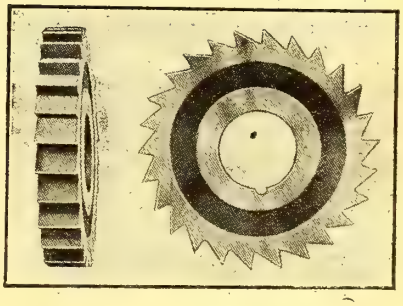
HIGH-SPEED SIDE AND FACE MILLING CUTTER



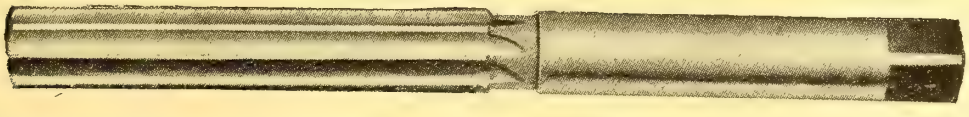
Good Deliveries

Send us Your Requirements

HIGH-SPEED SLOTTING CUTTER



HIGH - SPEED STEEL HAND REAMERS



The HIGH SPEED TOOL Manufacturing Co., Ltd.,
SHAFTESBURY ROAD, BOLLO BRIDGE ROAD, ACTON, W.3.
Phone—CHISWICK 655.
Telegrams—HYSPECUT, PHONE, LONDON.

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

May 2nd, 1918.

COPPER.—There is no change whatever in prices, and supplies are being well maintained, although the output of Copper in U.S.A. has not reached the maximum figure possible.

It is very unlikely that there will be any alteration in prices at present.

Prices.

Standard	£110 0 0
Electrolytic	£125 0 0 to £121 0 0
B.S.	£123 0 0 to £119 0 0

TIN.—Prices are reaching a most abnormal figure, having advanced over £20 per ton in a week. Very little tin has been received recently and there is not much being bought by English buyers in Eastern markets to replenish rapidly depleting stocks, owing to the prices which are being demanded.

The position in U.S.A. is very desperate and buyers appear to be keenly buying up any available stocks in the East irrespective of prices. The situation is most complex, speculation in the East is uncontrolled and it does not appear to be possible for prices to assume a reasonable level until some arrangement has been made with sellers in the East.

There are rumours of changes taking place in the system of controlling supplies here.

Comparative Prices.

April 25th	£350 0 0 per ton.
April 19th	£330 0 0 per ton.
April 17th	£327 0 0 per ton.
Highest price, 1917	£309 0 0

LEAD.—Munition firms are being kept supplied, but supplies are not too satisfactory. Prices remain unaltered.

STEEL.—The demand for all classes of Steel shows no signs of diminishing, supplies are, however, very satisfactory. H.S. Steel is more difficult to procure and buyers are advised to look a long way ahead.

It is understood that the Ministry is considering an application for an increase in the maximum prices for Steel, and it is more than likely that the application will be successful, their decision is expected during the next few days. Official prices remain unaltered.

TIMBER.—There is no doubt whatever that everyone connected with aircraft work realises that the country is faced with a most serious crisis. The use of a certain substitute timber has been officially prohibited for any parts whatever, and it is stated that machines in France having units built up of this timber have been dismantled and the wood taken out, and contractors having machines in progress have been compelled to do the same.

The outlook was never more grave, and, seeing that the output of aeroplanes depends upon ample supplies of suitable timber being available, it will be apparent to the uninitiated that the position of this country so far as aeroplane output is concerned is most critical.

Further regulations have been issued governing the purchasing of timber outside the United Kingdom. It is also pointed out that a further order will be issued shortly, regulating the use of timber in this country whether bought outside or inside the United Kingdom. Particulars of the Order are printed elsewhere.

Mahogany is a little more difficult to procure. Prices are unaltered.

FABRIC.—The position is unaltered and prices remain the same.

NEW IMPORT REGULATIONS.

T. 24847.

The Timber Order, 1918, dated April 25th, 1918, made by the Board of Trade, pursuant to Regulations 2 E. and 2 JJ. of the Defence of the Realm Regulations.

The Board of Trade, deeming it expedient to make further exercise of their powers under the Defence of the Realm Regulations as respects timber, hereby order as follows:—

1. Until further notice, no person shall in the United Kingdom, buy, sell, or receive, or enter into any transaction or negotiation in relation to the sale, purchase, or transport of any timber grown outside the United Kingdom which is not actually in stock in the United Kingdom at the date of this Order, except under and in accordance with the terms of a permit granted by or on behalf of the Controller of Timber Supplies, subsequent to the date of this Order.

2. Infringements of this Order are offences against the Defence of the Realm Regulations.

3. This Order may be cited as the Timber Order, 1918.

(Signed) H. Llewellyn Smith.
A Secretary to the Board of Trade.

Board of Trade, S.W.1.

Board of Trade Announcement to Accompany Timber Order, 1918.

The Board of Trade direct the attention of all persons in this country concerned with dealing in timber of any kind outside the United Kingdom to the terms of the Timber Order, 1918, published in the "London Gazette" for April 26th. Under this Order, a permit is necessary from the Controller of Timber Supplies, Board of Trade, Caxton House, Tothill Street, Westminster, London, S.W.1, before entering into any transaction relating to timber grown outside the United Kingdom, and not actually in stock in the United Kingdom.

A permit is also necessary before receiving or arranging for the transport of any such timber not in stock in the United Kingdom. Holders of licences to import are not excepted, and must apply to the Controller of Timber Supplies before arranging for the charter of tonnage or taking delivery of timber purchased abroad.

The present Order will, it is expected, be followed before long by another, regulating not only dealing in timber, but also its use in this country, whether grown outside or inside the United Kingdom. Virtually, the entire importation of timber will be effected on account of the Government, this arrangement following upon prolonged negotiations between the Controller of Timber supplies and representatives of the timber trade.

The Timber Order, 1918, is not designed to interfere with the normal business of firms established in the Dominions or Colonies as timber producers, but is intended to prevent speculative transactions in timber in the countries of origin by or on behalf of persons in the United Kingdom.

Copies of the Order will shortly be on sale through newsagents or booksellers, or direct from His Majesty's Stationery Office, Imperial House, Kingsway, London, W.C.2.

Board of Trade, April 25th, 1918.

A GALLAY FESTIVITY.

The Gallay Radiator Co., Ltd., held a Dinner on April 26th at Frascati's to commemorate the attainment of a production of —— radiators per week.

Capt. Kennedy, in a very interesting speech, complimented the management and the staff upon the fine quality of work which they had been doing in conjunction with the high rate of output which had been reached, and referred to the fact that there had been less friction with the sheet-metal workers in this country since the war began than with the men in any other trade. Certainly, there has been very little friction between the Gallay Company's Managing Director, Mr. Delaney, and his men; and after witnessing once more on Saturday night the very cordial relations which exist between his men and himself, one is inclined to think that Mr. Delaney is quite an ideal employer.

The Gallay Company are not content to rest upon their laurels, as it was several times mentioned during the evening that they intend to redouble their efforts with a view to re-doubling their output.

After dinner there was an excellent musical programme, which, unfortunately, had to be cut rather short, owing to the lighting restrictions.

THE OPERATION OF PRODUCER-GAS PLANTS.

Aircraft constructors who are interested in works power plant are recommended to apply to the Vacuum Oil Co., Ltd., Caxton House, Westminster, S.W.1, for a copy of an illustrated pamphlet issued by this firm on the subject of vertical gas engines. This pamphlet describes very clearly with the aid of the most elaborate and beautifully executed coloured diagrams the operation of the stationary gas engines and the method in which producer gas is made.



THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

Head Offices, Showrooms, and Stores:

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2

Managing Director: G. H. MANSFIELD.

Telephone: Gerrard 276.

Telegrams: "Upcast, Rand," London.

Get into Touch with "ASCOL" Representatives.

IN order to bring our business into closer touch with Aircraft Manufacturers throughout the country, we have appointed representatives in Yorkshire, the Midland Counties, Scotland, and Ireland (*see below*). We shall shortly appoint other representatives for the Eastern and Western Counties, details will be announced later. Three representatives are attached to our Head Offices at Long Acre for the London District.

These gentlemen will call regularly, and will keep firms posted as to stocks in hand and deliveries expected. We trust that our clients will make use of their services, to the advantage of all concerned.

IRELAND.

F. COE WILSON, 149, Donegal Street, BELFAST.
Telephone—297.
Telegrams—"Comfort," Belfast.

SOUTH COAST.

J. S. BIRKS, 93, Above Bar, SOUTHAMPTON.
Telephone—40 Southampton.
Telegrams—"Upcast, Southampton."

MIDLAND COUNTIES.

L. J. SERIN, 54a, International Exchange, Edmund Street, BIRMINGHAM.
Telephone—1213 Central.
Telegrams—"Upcast, Birmingham."

YORKSHIRE DISTRICT.

H. DE GREY FIRTH, Prudential Buildings, Park Row, LEEDS.
Telephone—3829 Central.
Telegrams—"Jupiter, Leeds."

JAMES THOMSON & SON (MOTOR FACTORS), LTD.
NEWCASTLE-ON-TYNE—73, Pilgrim Street.
Telephone—City 328 (2 lines).
Telegrams—"Distribute, Newcastle-on-Tyne."
EDINBURGH: Castle Works, Lady Lawson Street.
Telegrams—"Accelerate, Edinburgh."
Telephone No.—Central 8843 (4 lines).
GLASGOW—65, Mitchell Street.
Telephone—Central 754 (3 lines).
Telegrams—"Accelerate, Glasgow."

S·B·A·C
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

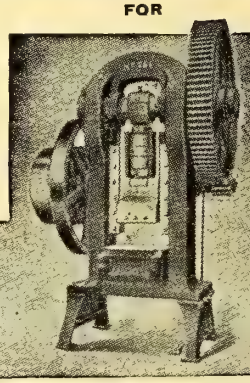
TRADE MARK
ASCOL
REGISTERED

BLISS

PRESSES & DIES
FOR

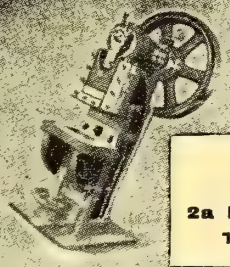
AEROPLANE

SEND YOUR STAMPING PROPOSITIONS TO US.



STAMPINGS

WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.





WRITE TO

E. W. BLISS CO.,

2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1

TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."

B.T.H. Magnetos

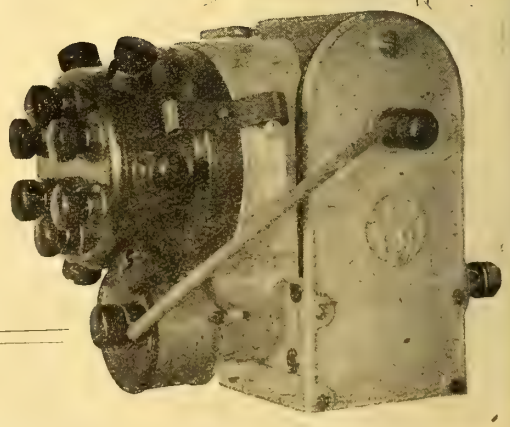
are All-British in design and manufacture, and used wherever absolute reliability in service is essential.

B T-H

The Electrical Hall Mark for Quality.

The British Thomson-Houston, Co., Ltd.,
Electrical Engineers and Manufacturers,
Lower Ford Street, Coventry, England.

Member of the British Ignition Apparatus Association.



AIRCRAFT FINANCE

CURRENT TOPICS.

THE NEW TAXATION.

Although the additional taxation imposed by the Chancellor of the Exchequer was not nearly so drastic as was in many quarters expected, the Budget demands coupled with the uncertainty of the effect on general industry of the working of the Man Power Bill has had the not unnatural result of an important depreciation in the market value of securities.

The usual statement published in the "Bankers' Magazine" dealing with the movement in Stock Exchange values between March 18th and April 18th shows an all-round depreciation amounting in the aggregate to a very considerable sum notwithstanding that some improvement is noted in British funds and in certain Bank and Railway shares.

Dividends Free of Tax.

It is a curious fact that the general investing public show a keen demand for shares on which the dividends are paid "free of income tax." Not unnatural, perhaps, in the present existing circumstances. It is, however, necessary to point out that with the exception of the tax-free War Loan there is no other security whose holders can avoid paying income tax. The statement free of income tax is therefore an anomaly.

The company paying dividends free of tax simply means that the company provide the tax and consequently the shareholder receives a corresponding amount less by way of dividend. The shareholder is not a scrap better off, and in point of fact may be so much worse off if he happens to be an individual not liable to pay the full rate of income tax, and investors would be well advised not to follow blindly what appears to be a new vogue.

AERIAL MAIL SERVICE COMPANIES.

Several projects are mooted for establishing companies to undertake the transport of mails by aircraft, and particulars were published last week of the Scandinavian Company to ply between Aberdeen and Copenhagen, which is already practically a *fait accompli*.

Naturally, Great Britain and her Allies are at present utilising every form of aerial transport for the exigencies of the military demands and requirements, and these countries are consequently for the moment debarred from inaugurating anything along these lines, although it is common knowledge that there are quite a number of machines which do not come up to the standard required for Government work and others that are obsolete which might well be set aside and utilised by private concerns for assisting the present congestion of transport. In the meantime the neutral countries continue to set the pace in this field of enterprise.

New Developments.

The latest is a Dutch company which will start operations by establishing an inland aerial postal service between Amsterdam and Groningen, and is discussing the project of establishing a regular aerial postal service between Rotterdam and England.

The Director General of Posts and Telegraphs of Holland has already opened up communications with the British authorities on the subject, and news of an accord may shortly be announced.

Whilst the moment may not be opportune to organise a company for such purposes in this country it would be well for those interested not to totally neglect consideration of the subject, or when the time for action does come British aircraft manufacturers may find themselves hemmed in.

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

The files of the following new companies are available for inspectiin at Somerset House.

A. & H., Ltd.—Private Company. Registered March 25th. Capital, £3,000 in £1 shares. Manufacturers of and dealers in animal-drawn and motor vehicles and accessories, engines, aircraft, motor boats, submarines, torpedoes, munitions, tools, etc., The subscribers (each with one share) are: P. W. Mall, 28a, Basinghall Street, E.C.2, accountant; L. A. Carter, 113, Bravington Road, Maida Hill, W.9, clerk. The first directors are: F. R. Heyman and F. H. Arnott (joint managing directors). Registered offices, 33, Grange Road, Willesden Green, N.W.

British Emaillite, Co., Ltd.—Private Company. Registered April 22nd. Capital, £100,000 in £1 shares. To take over the business of manufacturers and dealers in dope for aircraft formerly carried on by a company of the same name (now in liquidation), etc. The subscribers (each with one share) are:—E. J. Toomey, 18, New Street, S.W.1, bookkeeper; W. R. Prentice, 30, Regent Street, S.W.1, ex-officer mercantile marine. Permanent director: W. R. Prentice. Registered office: 30, Regent Street, S.W.

General Aeronautical Co., Ltd.—Private company. Registered April 22nd. Capital, £30,000 in £1 shares. To take over the business of manufacturers of and dealers in aeroplanes and parts thereof, and in particular propellers and airscrews, formerly carried on by a company of the same name. Incorporated in 1914. The subscribers (each with one share) are:—E. J. Toomey, 18, New Street, S.W.1, bookkeeper; W. R. Prentice, 30, Regent Street, S.W.1, ex-officer mercantile marine. Permanent director: W. R. Prentice. Registered office: 30, Regent Street, S.W. Qualification: One share.

Henry Arrault, Ltd.—Private Company. Registered April 23rd. Capital, £5,000 in £1 shares. To take over the business of a school of motor and aircraft driving, repairing, constructing and managing carried on at 51, York Terrace, Regent's Park, N.W., as "Hy Arrault." The subscribers (each with one share) are: Hy. Arrault, 51, York Terrace, Regent's Park, N.W., engineer in aeronautics; A. D. Mackenzie, Harewood House, Hanover Square, W.1, gentleman. The first directors are: Hy. Arrault, A. D. Mackenzie and A. J. Stevens. Solicitors: Stevens and Flinn, Farnham, Surrey.

Moore Radiator Tube Co., Ltd.—Private Company. Registered April 20th. Capital £2,000 in £1 shares. To take over the business of tube makers carried on by F. Moore and E. Buckler, at 62, Gooch Street, Birmingham, as the "Moore Radiator Tube Co.," and to carry on the business of mechanical, electrical and general engineers, aircraft manufacturers, shippers, etc. Agreement between F. Moore, T. W. H. Jones, and E. Buckler. The subscribers (each with one share) are:—

T. W. H. Jones, 18, Milford Road, Harborne, Birmingham, director.

F. Moore, 18, Lee Bank Road, Edgbaston, Birmingham, tube drawer.

E. Buckler, 83, Parade, Sutton Coldfield, tube drawer.

The first directors are:—F. Moore, T. W. H. Jones, and E. Buckler. Registered office: 62, Gooch Street, Birmingham.

Standard Air Press, Ltd. Private company. Registered April 22nd. Capital, £1,000 in £1 shares. To carry on the business of printers and publishers of newspapers and periodicals, etc., and to enter into an agreement between the Aeronautical Institute of Great Britain and Blin Desbleds of the one part and C. Fearnley of the other part. The subscribers are:—Col. Maude, C.B., R.E., 75, Perham Road, W.14, 5 shares; Blin Desbleds, 23, Flood Street, Chelsea, S.W., engineer, 5 shares. The first directors are to be appointed by the subscribers. Registered office: 3, Arlington Street, W.

MORTGAGES AND CHARGES.

W. H. Allen Son & Co., Ltd.—Mortgage registered April 9th, 1918. £160,000 in favour of the solicitor for H.M. Treasury and Munitions Department charged on the general assets of the company.

SATISFACTIONS.

Glendower Aircraft Co., Ltd.—Satisfaction filed April 11th, 1918, of all monies due registered May 24th, 1917.

A. V. Roe & Co., Ltd.—Satisfaction filed April 11th, 1918, of £20,000 registered June 27th, 1916, and of £30,000 registered August 13th, 1917.

COMPANIES WINDING UP.

British Emaillite Co., Ltd.—Resolved to reconstruct the company, and for this purpose the company be wound up. Liquidator, Mr. J. Friends, 43, Torridge Road, Thornton Heath (accountant), who is authorised by special resolution passed April 5th, confirmed April 22nd, to consent to the incorporation of a new company with similar title.

General Aeronautical Co., Ltd.—Resolved to reconstruct the company, and for this purpose the company be wound up. Liquidator, Mr. J. Friends, 43, Torridge Road, Thornton Heath (accountant), who is authorised by special resolution passed April 5th, confirmed April 22nd, to consent to the incorporation of a new company with a similar title.



"TRIPLEX" SAFETY GLASS

is 100 per cent. more efficient than substitutes for Glass. Absolutely as safe as celluloid yet clear as crystal. For Goggles, Windscreens and Observation Panels it stands alone.

Goggles from **7/6** per pair. Catalogue on Request.

The "TRIPLEX" SAFETY GLASS Co., Ltd.
(Reginald Delpech, Managing Director),
1, Albemarle Street, Piccadilly, London, W. 1.
Tel. No.—Regent 1340. Telegrams—"Shatterlys, Piccy, London."

Collision in a Snowstorm. The Only Survivor's Sight Saved by "TRIPLEX"

10th February, 1917.

Dear Sirs,

These "Triplex" Goggles have undoubtedly saved my eyesight, as I fell a distance of 350 feet while on duty in France.

The accident was caused by the collision of two machines in a snowstorm. The severity of the accident is evident by the fact of both pilot and observer in one machine being killed, and the observer in the other; I being the only survivor.

Yours truly,
Capt.....R.F.C.

W.

Alldays

"EMPIRE" Positive Pressure Blower

For use in the construction of Aeroplanes.

This Blower is specially suitable for Gas and Oil Furnaces, Blow Pipes, or any other work requiring a uniform steady pressure.

Simple in construction and positive in action.

Ask for Stock sizes, mentioning Department W.

Sole Makers **Alldays & Onions Pneumatic Engineering Co, Ltd.**
BIRMINGHAM
And at
58, Holborn Viaduct, LONDON.





on a "Belfast Roof" is an ideal covering for Hangars. Any width

UP TO 100 FEET CLEAR SPAN.

Outlasts galvanized iron, more equable temperature.

BRITISH & BEST

Write for Booklet "R."

49

D. ANDERSON & SON, Ltd., Lagan Felt Works, Belfast; and Roach Road Works, Old Ford, London, E.

(*Continued from page* 1696.)

War Office, May 6th.

REGULAR FORCES.—Establishments.—Equipt. Officer, 1st Cl.—Capt. T. I. Walker, Lond. R., T.F., from the 2nd Cl., Feb. 1st.

Schools of Instrn.—School of Mil. Aeronautics.—Comdt. (Graded as a Wing Comdr.).—Maj. G. B. Stopford, R.A., from a Chief Instr. (graded as a Sqdn. Comdr.), and to be temp. Lt.-Col. while so empld., Jan. 1st.

Chief Instr. (Graded as a Sqdn. Comdr.).—Temp. Capt. G. H. Gordon, Gen. List, from an Instr. (graded as a Flt. Comdr.), and to be temp. Maj. whilst so empld., Jan. 1st.

Instrs. (Graded as Equipt. Officers, 1st Cl.)—From Asst. Instrs. (graded as Equipt. Officers, 2nd Cl.).—Capt. R. C. Gill, R.A. And to be temp. Capts. whilst so empld. :—Lt. G. A. Scutt, Middx. R., T.F.; Lt. A. Roberts, Welsh R., T.F., from a Flying Officer (Obsr.); temp. Lt. C. H. Collins, Gen. List, from an Asst. Instr. (graded as an Equipt. Officer, 2nd Cl.), Jan. 1st.

Asst. Instrs.—(Graded as Equipt. Officers, 2nd Cl.)—Temp. Lt. S. O. Hillman, Gen. List, a Flying Officer (Obsr.), Jan. 1st. And to be temp. Lts. whilst so empld. :—Temp. Sec. Lt. G. H. Heeley, Gen. List, an Equipt. Officer, 3rd Cl., Jan. 2nd; temp. Sec. Lt. F. Waller, Gen. List, a Flying Officer (Obsr.), Jan. 15th; temp. Sec. Lt. A. G. Knight, Gen. List, an Equipt. Officer, 3rd Cl.; temp. Sec. Lt. L. G. Mace, Gen. List, an Equipt. Officer, 3rd Cl., March 1st; Sec. Lt. (temp. Lt.) A. W. Turner, Gen. List, an Equipt. Officer, 2nd Cl., March 7th; temp. Lt. M. K. Jones, Gen. List, a Flying Officer (Obsr.), March 16th.

Examining Officer.—(Graded as an Equipt. Officer, 1st Cl.)—Lt. R. W. Jepson, Ches. R., Spec. Res., to be secd., and to be temp. Capt. whilst so empld., March 7th.

FROM THE COURT CIRCULAR.

Windsor Castle, May 2nd.

The King, attended by Comdr. Sir Charles Cust, Bt., R.N., and the Earl of Cromer, paid a visit of inspection to the Royal Air Force Armament School at Uxbridge this morning.

His Majesty was received on arrival by Colonel A. C. H. MacLean and Staff.

Brig.-Gen. J. G. Hearson, Director of Training, Royal Air Force, was also in attendance.

Windsor Castle, May 4th.

The following Officer had the honour of being received by His Majesty at Buckingham Palace, when the King invested him with the Insignia of the—

Distinguished Service Order.—Lt.-Col. the Hon. Anthony Byng, R.A.F.

The King then conferred the following decorations :—

A Bar to the Military Cross.—Maj. Percy Sherren, Can. Inf. and R.A.F.

The Military Cross.—Capt. Raymond Brownell, R.A.F.; Capt. Frank Gorringe, R.A.F.; Lt. Arthur Cooper, R.A.F; Lt. David Hurr, Middlesex Regt., attd. R.A.F.; Lt. Maurice Milsom, Royal Fusiliers, attd. R.A.F.; Lt. Lyell Spence, Can. F.A., attd. R.A.F.; Lt. William Wallace, R.A.F.; Sec. Lt. John Manicon, R. W. Surrey Regt., attd. R.A.F.

OFFICIAL COMMUNIQUES.

NAVAL.

May 6th.—During the period April 29th-May 5th inclusive, Air Force contingents working from Dunkirk carried out bombing operations against Ostend, Westende, Zeebrugge Mole, lock gates, seaplane base, and enemy shipping in the vicinity.

Direct hits were obtained on the Mole and seaplane base and on the docks at Zeebrugge.

One of our machines failed to return.

In the course of offensive patrols one enemy two-seater machine was destroyed and another driven down out of control.

* * *

The following account, which may be Naval official, is from the "Times" of May 7th :—

The birds of the Naval Pigeon Service, numbering several thousand, have long since taken a recognised place in the war, and have repeatedly been the means of saving lives at sea.

An air patrol fell in with some German seaplanes, and messages were received at a seaplane station in Flanders. The first was :—"Short shot down 10 miles N.N.E. Nieuport. One Hun down. My tanks shot. French t.b.d. on its way. Send fighters quick." Then followed another pigeon with :—"Am shot down. Hit in tank radiator. Observer dead. Am unhurt. turning over to port. Have jettisoned everything. Am on wing tip. Sea calm. Machine has seemingly steadied. Nothing in sight. I think machine will float a long time. Send small craft at once. Land 'bus has just made one circuit, but I don't think he saw me. My love to my mother. Tell her I am not worrying. If machine sinks I will swim to a buoy close by."

Ninety-five per cent. of messages sent by pigeon have been delivered.

MILITARY.

G.H.Q. Communiqués.

April 30th, 8.50 p.m.—On the 29th inst. low reconnaissance work was again carried out by our aeroplanes.

East of Locre the enemy's troops offered good targets to our pilots, who dropped 275 bombs on them, and engaged them with machine-gun fire.

Seven hostile machines were brought down in air fighting, and one other was shot down by our infantry.

Two of our aeroplanes are missing.

May 1st, 8.30 p.m.—On April 30th mist and rain again prevented flying, except for a few low reconnaissances, in the course of which bombs were dropped on the enemy's troops between Locre and Voormezeele.

One hostile machine was driven down and forced to land behind our lines.

One of our aeroplanes is missng.

May 2nd, 9.4 p.m.—On the 1st inst., the unfavourable weather continued, and only short-distance reconnaissances, carried out by our aeroplanes at a very low height, and bombing were possible.

None of our machines is missing.

On the 2nd inst. a ton of bombs were dropped on the railway station and sidings at Thionville. One burst was seen on the Carlshutt Works, where a fire was started. Several bursts



HONOURING THE DEAD. The funeral of Rittmeister Freiherr Manfred von Richthofen. Flying officers formed the bearer party; Australian infantry the firing party.

were observed on the barracks and on the railway station and sidings.

All our machines returned.

May 3rd, 9.28 p.m.—Although the weather was fine on the 2nd inst., a thick haze interfered with the work of our aeroplanes and artillery.

Several important reconnaissances were carried out, and many photographs were taken well in rear of the enemy's lines. Three and a half tons of bombs were dropped on Bapaume and other targets in the battle areas.

At times fighing in the air was severe. Fourteen hostile machines were brought down and four others were driven down out of control.

Five of our machines are missing.

During the night five and a half tons of bombs were dropped by us on Chaulnes, Juniville railway junction, Bapaume, and Caix.

Three very heavy bombs were dropped also from a low height on the lock gates at Zeebrugge.

On the 3rd inst. another most successful raid was carried out by us against the railway station and sidings at Thionville. Carlshutte works were again hit, and several bursts were seen on the station, in the sidings, and on the gasworks.

All our machines returned.

May 4th, 9.25 p.m.—On the 3rd inst. a most successful day's work was accomplished by our aeroplanes. Reconnaissances were carried out over all important areas, and a great many photographs were taken. Good visibility assisted the co-operation of our aeroplanes with the artillery.

Bombing was carried out with the utmost vigour, and a total weight of over 20 tons of bombs was dropped on Chaulnes, Tournai, and La Bassée railway stations, and on Estaires, Marcelcave, Menin, Comines, and Middelkerke.

Fierce fighting continued all day. Twenty-eight German machines were brought down and five others were driven down out of control. In addition, our anti-aircraft guns shot down three of the enemy's machines within our lines.

Eleven of our aeroplanes are missing.

After dark a thick mist set in on most parts of the front. Over two tons of bombs were dropped by us, however, on Chaulnes and Juniville railway junctions. In spite of the very bad weather encountered, all our machines returned.

May 5th, 9.31 p.m.—On the 4th inst. there was a dense mist till the afternoon, when the weather cleared slightly. Reconnaissances, photography, and bombing were carried out. Nine tons of bombs were dropped on Chaulnes railway junction, on Bapaume, Armentières, Merville, and Estaires.

There was very little fighting in the air. One hostile machine was brought down by our aeroplanes, and four others were driven down out of control.

Two of our machines are missing. Two of our aeroplanes, which were reported missing on the 3rd inst., have since returned.

After dark, although the weather continued to be unfavourable for flying, over three tons of bombs were dropped on Chaulnes railway junction and Bapaume.

All our machines returned.

May 6th, 9.5 p.m.—On the 5th inst., beyond a few low reconnaissances and some bombing, no work in the air was possible owing to rain and mist.

War Office Communiqués.

May 3rd.—The G.O.C. Italy reports:—

Following a prolonged period of incessant rain and mist, fine weather has at length set in. Patrol activity on both sides has been considerable; we have captured several prisoners. Much counter-battery work is being carried out, and a number of explosions have resulted in the hostile battery positions.

Since my last report the Royal Air Force have destroyed 12 enemy aeroplanes, with a loss of three machines themselves. This brings the total number destroyed since the arrival of the British forces in Italy up to 109.

Our loss in the same period has been 13 machines.

May 4th.—The G.O.C. Palestine reports:—

Throughout May 2nd fighting continued east of the Jordan at and to the south of Es Salt.

Our air service attacked troops and rolling stock on the Hedjaz Railway in the vicinity of Amman (15 miles south-east of Es Salt), and in the Wadi Sir (midway between Es Salt and Amman) with bombs and machine-gun fire.

Two of our machines failed to return.

THE CASUALTY LIST.

NAVAL.

Reported May 1st.

Previously reported Missing, believed Drowned, now presumed Drowned.—Gillespie, Flt Sub-Lt. L. H. G., R.N.

Reported, May 6th.

Previously reported Missing, now reported Died of Wounds as Prisoner.—Booth, Flt. Sub-Lt. F., R.N.

MILITARY.

Reported May 1st.

Previously reported Missing, now reported Prisoner in German Hands.—Cassels, Sec. Lt. H. K., R.F.C.

Reported May 2nd.

Previously reported Missing, now reported Killed.—Dempster, Sec. Lt. I., MacK., R.F.C.
McKay, Capt. A. E., R.F.C.
Mansell, Lt. W. S., E. Surr. R., attd. R.F.C.

Australian Force.—Killed.—Best, Lt. G. W., A.F.C.
Lewis, Lt. O. G., A.F.C.

Wounded.—Baschain, Sec. Lt. J. P. G., A.F.C.; Paul, Lt. G. A., A.F.C.; Rees, Sec. Lt. A. W., A.F.C.

Reported May 3rd.

Australian Force.—Wounded.—Fryberg, Lt. L., A.F.C.
Suess, Lt. O. H., A.F.C.

Reported May 4th.

Canadian Force.—Previously reported Missing, now reported by German Government Killed or Died of Wounds.—MacLean, Capt. A. P., Cent. Ont. R., attd. R.F.C.

Accidentally Killed.—Lewtas, Lt. F. G., B.C.R., attd. R.F.C.

Wounded.—Duke, Lt. L. de S., B.C.R., attd. R.F.C.
Nickle, Capt. D. J., Can. For. Corps, attd. R.F.C.

Missing.—Junor, Lt. K. W., Can. M.G.C., attd. R.F.C.

Previously reported Missing, now reported Wounded and Prisoner in German Hands.—Chant, Lt. E. M., B.C.R., attd. R.F.C.

Reported May 6th.

Previously reported Missing, now reported Prisoners in German Hands.—Ball, Sec. Lt. A. C., Sher. For., attd. R.F.C.
Currie, Lt. J. D., H.L.I. and R.F.C.

* * *

The following soldier, who was a prisoner in Germany, has now arrived in England:—

R.F.C.—Walker, 9329 A. G.

The following soldiers, who were prisoners in Germany, have arrived in Holland for internment:—

R.F.C.—Donald, 3022 T. H.; Jones, 2104 E.; Judge, 494 V.; Piper, 470 N. V.

AIR FORCE.

Reported May 3rd.

Killed.—Cann, Sec. Lt. P. R., Gen. List and R.A.F.
Jewell, Sec. Lt. J. B., Gen. List and R.A.F.
Moore, Sec. Lt. J. G., Gen. List and R.A.F.
Payne, Sec. Lt. A. A., Gen. List and R.A.F.
Roebuck, Sec. Lt. L., Gen. List and R.A.F.
Russell, Lt. W., R.E. (T.F.) and R.A.F.
Wollaston, Sec. Lt. J. D., Gen. List and R.A.F.

Wounded.—Brown, Capt. F. E., M.C., R. Dub. Fus. and R.A.F.; Dancy, Sec. Lt. W., R.G.A., S.R., and R.A.F.; Dixon, Lt. F. C., Manch. R., T.F., attd. R.A.F.; Hawley, Sec. Lt. A. C. R., Gen. List and R.A.F.; Hilton, Sec. Lt. V. K., Gen. List and R.A.F.; Hedges, Sec. Lt. R. B. T., Gen. List and R.A.F.; Horlock, Lt. A. G., E. Kent R., T.F., attd. R.A.F.; Horne, Sec. Lt. J. L., Gen. List and R.A.F.; Hyde, Sec. Lt. H. C., Leic. R., attd. R.A.F.; Langdon, Sec. Lt. R. T., Sco. Rif., T.F., and R.A.F.

Accidentally Injured.—Roff, Sec. Lt. A. E., Gen. List and R.A.F.; Wessell, Sec. Lt. W. M., Welsh R. and R.A.F.

Missing.—Burnand, Sec. Lt. R. A., Lond. R., attd. R.A.F.; Christie, Sec. Lt. E. W., Gen. List and R.A.F.; Critchley, Sec. Lt. R., Gen. List and R.A.F.; Coleman, Sec. Lt. C. B., Oxf. and Bucks L.I., attd. R.A.F.; Greasley, Sec. Lt. J. R., Gen. List and R.A.F.; Hanna, Sec. Lt. A. S., Gen. List and R.A.F.; Knowles, Sec. Lt. A. R., Gen. List and R.A.F.; Matthews, Lt. E. A., Som. L.I., attd. R.A.F.; Meredith, Sec. Lt. J., Gen. List and R.A.F.; Shreeve, Sec. Lt. F. D., Gen. List and R.A.F.; Williams, Sec. Lt. F., Gen. List and R.A.F.

Reported May 6th.

Killed.—Andrews, Sec. Lt. J. A. R., Linc. R., attd. R.A.F.
Bawle, Sec. Lt. D. L., R.A.F.
Boyd, Sec. Lt. R. H., Gen. List and R.A.F.
Broomhall, Sec Lt. O. A., L'pool R. (T.F.) and R.F.A.
Cheers, Sec. Lt. D. H. A., E. Surr. R. and R.A.F.
Cobb, Sec. Lt. F. W., Gen. List and R.A.F.

Wounded.—Buttle, Sec. Lt. W. J., Bord. R., attd. R.A.F.; Pope, Sec. Lt. K. W. D., Gen. List and R.A.F.; Proctor, Sec. Lt. H. F., Gen. List and R.A.F.; Stiles, Sec. Lt. C. D. B., Gen. List and R.A.F.

Missing.—Gillespie, Sec. Lt. D. V., Gen. List and R.A.F.; Hilton, Sec. Lt. R., Manch. R., attd. R.A.F.; Kennedy, Sec. Lt. J. G., Gen. List and R.A.F.; Payne, Lt. S. T., Gen. List and R.A.F.; Sneath, Lt. W. H., R.A.F.; Towne, Sec. Lt. L. L. F., Gen. List and R.A.F.; Wells, Sec. Lt. S. R., Gen. List and R.A.F.

Reported May 7th.

Killed.—Collins, Sec. Lt. L. E., Gen. List and R.A.F.
Colquhoun, Sec. Lt. A. S., Gen. List and R.A.F.
Craig, Sec. Lt. J., Gen. List and R.A.F.
Craig, Sec. Lt. R. S., Gen. List and R.A.F.

Contractors to H.M. Government.

Rotax

Makers of Aeroplane Fittings

Electric Equipment for Heating and Lighting.

Streamline Wires and Fittings.

Prompt Deliveries.

AERO WIND SHIELDS.

"Labyrinth" Relief Valves, Oil and Petrol Fillers, Pressure Pumps, Petrol Filters, Taps and Brass and G.M. Fittings generally.

Water Joint Clips, Turnbuttons, Shackles, and Small Parts.

Prices and Particulars on receipt of Enquiries.

NOTE.—We have an Illustrated Catalogue of our Aeroplane Fittings. Write us and we will send you a copy.

THE ROTAX MOTOR ACCESSORIES CO., LTD.,

Rotax Works, Willesden Junction, N.W. 10.

P.C.B. 7.

NOW READY.

SIXTH AND REVISED EDITION.

Price 7/6 net.
8/- Post Free.

THE AEROPLANE SPEAKS.

By

CAPTAIN H. BARBER, A.F.Ae.S.

With 40 Full Plates of "Types of Aeroplanes."

"A surprisingly useful book."—*Westminster Gazette.*

*** Six Editions of "The Aeroplane Speaks" have been called for in 15 months. The demand for the book grows month by month and the latest edition is by far the largest.

SONGS OF THE SUBMARINE

By Klaxon. 2/- net, 2/3 post free.

BALLADS OF THE FLYING CORPS

By G. R. Samways, R.F.C. 2/6 net, 2/9 post free.

These two volumes of verse are unique, because both are the outcome of actual experience. Both are in demand.

Order of your bookseller or direct from—

McBRIDE, NAST & Co., 2, Breams Buildings, E.C.

Now Ready. **5s. net, 5s. 4d. post free.**

Fully Illustrated with Diagrams.

HOW AN AEROPLANE IS BUILT.

By STEPNEY BLAKENEY.

With an Introduction by C. G. Grey.

*** This book contains the articles which appeared in the "Aeroplane" under the title "Construction of Aeroplanes and their Components." They have been thoroughly revised, and are reprinted in response to many requests.

Now Ready. **1s. 6d. net, 1s. 8d. post free.**

THE "AEROPLANE" BLUE BOOK.

A DIRECTORY OF AIRCRAFT FINANCE, 1918.

A handy, up-to-date and authoritative reference book on all matters affecting the Directorate, Capital, Accounts, etc., of Aircraft and Kindred Companies.

The "Aeroplane" & General Publishing Co., Ltd., 2, Breams Buildings, E.C.

Ford, Sec. Lt. N., R.E., attd. R.A.F.
Williams, Capt. F. E., Welsh R.

WOUNDED.—Lancashire, Sec. Lt. A. E., Gen. List and R.A.F.; MacFarlane, Lt. R. M. C., Gen. List and R.A.F.; Plenderleith, Sec. Lt. W. N., Gen. List and R.A.F.; Scrivener, Sec. Lt. J. A., Gen. List and R.A.F.; Stevens, Sec. Lt. E. D., Queen's Own Hrs., attd. R.A.F.

MISSING.—Barlett, Sec. Lt. G. G., Gen. List and R.A.F.; Bell, Sec. Lt. B. G. A., Gen. List and R.A.F.; Hudson, Sec. Lt. F. D., Gen. List and R.A.F.; Lewis, Sec. Lt. H. S., Gen. List and R.A.F.; Smith, Capt. S. P., A.S.C. (T.F.) and R.A.F.; Wingate-Gray, Lt. A. G., Gen. List and R.A.F.

ACCIDENTALLY DROWNED.—Greatwood, Sec. Lt. F. S., R. Suss. R and R.A.F.

PERSONAL NOTICES.

NAVAL.

DEATHS.

BATES.—Flt. Lt. Cyril Montague Bates, R.N.A.S., who died as the result of an accident whilst flying on April 24th, was the only son of Mr. and Mrs. P. M. Bates, of Surbiton. He was 18 years of age.

DUNFEE.—Flt. Sub-Lt. W. V. Dunfee, R.N.A.S., who was killed on active service on May 1st, was the only son of Mrs. W. L. Dunfee, 56, Church Crescent, Finchley, N.3. He was 18 years of age.

MEARS.—Flt. Sub-Lt. Henry Frank Mears, R.N., was killed whilst flying on April 29th. He was 18 years of age.

MILLAR.—Capt. Gilbert Henry Millar, R.A.F., who was accidentally killed while flying on April 29th, aged 33, was the third son of the late Henry E. Millar and Mrs. A. M. Millar, of Heathdown, Hampstead Heath, N.W. He was a scholar of Rugby and of Pembroke College, Cambridge, and took a double first in the Mathematical and Mechanical Triposes. Subsequently he joined the staff of the National Physical Laboratory. He was an accomplished yachtsman, and on the outbreak of war he joined the R.N.V.R. He was sent to Antwerp in Oct., 1914, was taken prisoner in the retreat, and was interned at Döberitz until Sept., 1915, when he effected his escape, in which he showed great courage and resource. On his return home he was given a commission in the R.N.V.R., being seconded for air duties, and was employed in both theoretical and practical work, qualifying as a pilot. In June, 1917, he was transferred to the R.N.A.S. as an observer with the Fleet.

* * *

The "Times" correspondent reports on May 2nd that Flt. Lt. A. T. N. Cowley, R.N., and Flt. Lt. C. G. Knight, R.N., have arrived in Holland from Germany for internment.

* * *

Mrs. Frank Brock wishes to express her grateful thanks for the numerous letters of sympathy she has received, and trusts everyone will understand how difficult it is to reply.

MILITARY.

DEATHS.

ASHWORTH.—Lt. Roger William Ashworth, Hampshire Regt., attd. R.A.F., who was accidentally killed on April 26th whilst flying, was the youngest son of the late Thomas Ashworth, of 2, Avenue Road, Regent's Park. He was 23 years of age.

KINNEAR.—Maj. John Lawson Kinnear, D.S.O., M.C., The King's (Liverpool) Regt. and R.A.F., who died as the result of an accident whilst in Hants, was the younger son of the late Rev. H. G. Kinnear, of Copgrove Rectory, Yorkshire, and of the late Mrs. Kinnear, of Park House, Ripon. He was 28 years of age.

LAST.—Sec. Lt. Leslie Last, R.F.A., attd. R.F.C., whose death was announced recently, was educated at the King Edward's High School, Birmingham, and Westminster. On the outbreak of war he mobilised with B. Battery of the H.A.C., and served with his battery in Egypt. In 1916 he returned home to take a commission in the R.F.A., and went out to Salonika at the end of year. Ten months later he transferred to the R.F.C. After securing his wings he was appointed an instructor, and it was while flying with a pupil that he met his death.

MARRABLE.—Lt. Edmund Douglas Marrable, R.F.A., who was killed in a flying accident in Kent on April 26th, was the only son of the late Douglas Heron Marrable and Mrs. Marrable, formerly of Dorchester. He was 24 years of age.

McHATTIE.—Lt. J. W. McHattie, R.A.F., late London Scottish and York and Lancaster Regt, who was reported killed on April 25th, was the son of Mr. James and Mrs. McHattie, of Enfield.

NEEDHAM.—Cadet George Francis Jack Needham, A.F.C., who was accidentally killed whilst flying on April 23rd, was the eldest son of the late John and Mrs. Needham, of Adelaide, Australia. He was 27 years of age.

PARKER.—Capt. Charles Allan Parker, M.C., R.F.C., who was killed whilst flying abroad on Feb. 19th, was the only son of Mr. and Mrs. Erskine Parker, of Tasmania, and the brother of the Hon. Mrs. Frank Eaton.

TATTON.—Capt. Eric Hudson Tatton, East Yorks. Regt. attd. R.A.F., was the youngest of the five sons of Mr. and Mrs Tatton, of Edgware, and joined the U.P.S. Brigade in Sept. 1914. He received his commission in the East Yorkshire Regt in Jan., 1915, and was gazetted lieutenant in the same year. He saw active service in Egypt and then in France, taking part in the offensive on July 1st, 1916. Subsequently he transferred to the R.F.C., and, obtaining his "wings," he was again at the front for eight months' active service. In July, 1917, he was sent back to England, and in August was gazetted captain and flight-commander. Until March he was acting as test pilot at aerodromes in England. On March 30th Capt. Tatton returned to the front, and was killed in action on April 20th, aged 23.

THOMPSON.—Capt. Philip Thompson, R.F.C., who was reported missing on March 23rd, and is now believed to have been killed while fighting his machine on that date, was the only son of Mr. Whitaker Thompson, who was chairman of the London County Council for 1910-11. Educated at St. Aubyn's, Rottingdean, and Winchester (Mr. Aris's house), he joined the R.F.C. in April, 1916. After some months in France he was chosen for night-flying defensive service in England, but soon after being promoted captain he was again posted to a squadron at the front. He was 19 years of age at the time of his death.

WINTON.—Sec. Lt. Harold Barkley Winton, R.A.F., was

SIXTH EDITION, 1918.

DYKE'S AUTO-ENCYCLOPEDIA.

THE STANDARD WORK ON MOTOR MECHANISM

Sanction has been given for this Book to be supplied through H.M. Stationery Office to Schools of Military Aeronautics.
Adopted by the American Government (War Dept.) for use in all their Aviation Schools.

A Thorough, Practical & Simple Treatise on Principle, Construction, Repairs and Troubles—and How to Remedy Them.

THE BOOK for the EXPERT and the STUDENT.

Containing upwards of 900 pages. 775 Illustrations on Electrical Subjects 1,189 Illustrations on Repairs and Adjustments. 300 Illustrations on "The Ford." 5 Coloured Inserts.

OVER 250,000 COPIES SOLD.

Price £1 : 1 : 0 net, post free, cash with order, from your Bookseller, or direct from the Publisher,

S. G. GILLAM, Dome Building, RICHMOND, SURREY.

*** *Prospectus on Application.*

J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.,
104, Criterion Works, Birmingham.

1336

NORTH BRITISH

"CLINCHER"

TYRES

The London Home of "Clincher" Tyres

Commandeered!

Our Great Portland Street building having been "commandeered" by the Government, we have had to find new premises at short notice.

The remarkable growth of our Tyre and Export businesses has necessitated our acquiring two separate buildings in London—in addition to our existing premises in East Road, N—and enquiries for the departments referred to should be directed to the new addresses below.

NEW LONDON ADDRESSES:

London and District Pneumatic Tyre Dept.:—

111-113, Great Titchfield Street,

OXFORD STREET, W.1.

Export Dept.:—

257-259, Oxford Street, W.1.

Near OXFORD CIRCUS.

THE NORTH BRITISH RUBBER CO., LTD.,

CASTLE MILLS, EDINBURGH.

Branches—Belfast, Bristol, Glasgow, Manchester, etc.

Mechanical Goods Dept.:

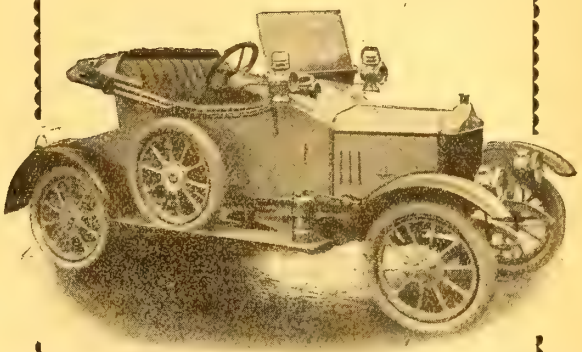
2, 4, 6, East Road, City Road, N.1.

Economy in Motoring

is represented by just how far your requirements are met by the type of machine you purchase. Study for yourself the advantages offered in the

'STANDARD'

Light Car and bear these in mind when we are able to resume deliveries. :: ::



THE STANDARD MOTOR Co LTD

COVENTRY

London Agents: The Bytchley Autocar Co Ltd 216 Gt Portland St W

G 9



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd.

The Linen Hall, Regent Street, London, W.

the only son of William and Edith Winton, of Beddington, Surrey. He was educated at Gore Court, Sittingbourne, and, gaining the first Old Salopian Scholarship, entered Mr. Chance's House at Shrewsbury in 1908. While there he was captain of "Fives," and represented the school at football. In 1912 he went up to Cambridge as a Benson Classical Exhibitioner of Magdalene College, with a Dr. Taylor's Exhibition from the school. He took his B.A. degree by proxy in 1915. In Sept., 1914, he enlisted as a private in the 16th Middlesex Regiment (Public Schools), and went to France in November, 1915, where he was wounded on June 28th of the following year. On August 13th, 1917, he was transferred to the R.F.C., and, obtaining his wings in February, he went to the front as a pilot on April 6th, 1918, and was killed in an aeroplane accident on April 21st. He was 24 years of age.

Engagements.

ROE—STOPES.—A marriage has been arranged between Lt. Humphrey Verden Roe, R.F.C., late of the Manchester Regt., and Marie Carmichael Stopes, D.Sc., Ph.D., Fellow and Lecturer in Palæobotany at University College, London, and the author of various scientific works.

Mr. Roe served through the South African War as a subaltern in the 1st Manchester Regiment, afterwards becoming joint founder and managing director of A. V. Roe and Co., Ltd., from which he resigned to join the R.F.C. on active service in France.

SELBY—BARTRUM.—The marriage of Capt. J. G. Selby, M.C., R.F.A. and R.F.C., and Miss Dorothy Bartrum will take place very quietly at the Chapel Royal, Savoy, on Wednesday, May 15th, at 12. All friends will be welcome at the church.

Marriages.

CORNER—WALDEN TAYLOR.—On Thursday, May 2nd, at St. Paul's Church, Winchmore Hill, N., Sec. Lt. Wilfred Geo. Corner, the King's (Liverpool) R., attd. R.A.F., sixth son of Mr. and Mrs. E. H. Corner, of 4, Arundel Square, N., was married to Muriel Walden, eldest daughter of William Jno. Taylor, of Benwell, Newcastle-on-Tyne, and granddaughter of the late Maj. T. P. Walden, R.G.A.

LEARMOUNT—BALL.—A marriage took place at St. James's Church, Muswell Hill, on Tuesday, May 7th, between Maj. Leonard Wright Learmount, D.S.O., M.C., R.A.F., only son of R. K. Learmount, of Gosforth, and Ada Elizabeth Ball, elder daughter of A. Ball, of 86, Rosebery Road, Muswell Hill, N.

Births.

BESWICK.—On May 2nd, 1918, at Kenwood, Weybridge, to Margery, the wife of Lieut. K. E. Beswick, R.F.C.—a daughter.

THOMPSON.—On April 30th, at Richmond House, Wimbledon Common, the residence of her parents, Madge, the wife of Capt. Wyvol Thompson, R.F.C.—a daughter.

* * *

Lt. Alan Reeve, Central Ontario Regt., attd. R.F.C., was reported missing on March 27th. Mrs. Jolly, 391, Unthank Road, Norwich, will be thankful for information.

* * *

It is reported that Capt. Alan Bott, M.C., R.F.C., whose writings under the pseudonym of "Contact" have given so much pleasure and education, has been wounded and taken prisoner in Palestine. He won his M.C. while flying in France.

Capt. Bott was originally on the staff of the Reuter Agency on the Continent.

* * *

News has been received that Capt. J. L. Trollope, R.F.C., who was reported missing on March 28th or 29th, is wounded and a prisoner in German hands.

* * *

The correspondent of the "Times" reported on May 2nd that the following officers have arrived in Holland from Germany for internment:—

Aked, Lt. H. L. C., W. York R., attd. R.F.C.; Atkinson, Lt. J. M., A.S.C., attd. R.F.C.; Castle, Lt. J. S., R.F.C.; Cairnduff, Lt. A., R. Mun. Fus. and R.F.C.; Golding, Sec. Lt. K. L., R.F.C.; Goodson, Sec. Lt. A. R. L., Lond. R. and R.F.C.; James, Capt. C. E. H., 2nd Welsh R. and R.F.C.; Joyce, Lt. W., Bed. R., attd. R.F.C.; Lerwill, Lt. O., R.F.C.; Littlewood, Lt. S. C. T., 3rd L. N. Lanc. R. and R.F.C.; Maxwell, Lt. G. E., R.F.C.; Mortimer-Phelan, Lt. W. C., R.F.C.; Newbold, Sec. Lt. L. A., Essex R. and R.F.C.; Owen, Capt. D., Can. Gen. List, attd. R.F.C.

AIR FORCE.

Deaths.

CARLING.—Lt. John Burleigh Carling, R.A.F., who died on May 5th in hospital at Croydon of an illness contracted after many months on active service, was the youngest son of Mr.

BURBERRY R.A.F. KIT



Illustrated Military Catalogue Post Free.

BURBERRYS supply correct and well-tailored Uniforms, Weatherproofs, Air-Warms, Fur Undercoats, Leather Coats, British Warms, Caps, and every detail of R.A.F. dress and equipment, at reasonable prices

BURBERRY KIT, made in special Burberry-woven and proofed cloths, in textures suitable for France, or the Near or Far East, provides an effective safeguard against wet or wind without rubber or other air-tight agents, and, whilst lightweight, is the strongest and most comfortable equipment for facing the atmospheric conditions of varying altitudes.

Service Weatherproofs.
During the War BURBERRYS **Clean and Re-proof** Officers' "Burberrys," Tielockens, Burfrons, and Burberry Air-Warms **FREE OF CHARGE.**

Complete Outfits in 2 to 4 Days, or Ready-to-Wear.

BURBERRYS Haymarket S.W. 1. LONDON
8 & 10 Bd Malesherbes PARIS; also Provincial Agents

JEWELLERS BY APPOINTMENT SILVERSMITHS



Patent No. 11876/15

THE "MILITARY" LUMINOUS WATCH.

A THOROUGHLY reliable and practical luminous watch, indispensable for Naval or Military Service. The "Military" Luminous Watch is the only Screw Case Silver Watch fitted with a "hunter" cover, and is the exclusive patent of The Goldsmiths and Silversmiths Company, Ltd.

As illustrated. £4 12 6 Without Cover £3 15 0

THE GOLDSMITHS & SILVERSMITHS COMPANY LTD. with which is incorporated The Goldsmiths Alliance Ltd. Established 1751

Only one Address (no branches):
112, REGENT STREET, LONDON, W.

THE USE OF

NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.
Contractors to all Government Departments.
Offices: 407/9, OXFORD St., LONDON, W. Works: SOUTHALL MIDDX.

HIGH-CLASS

ALUMINIUM CASTINGS

FOR ALL TRADES.

We Specialise in Aluminium Cylinders and General Aero and Motor Engine Castings,

CAST IRON CYLINDERS

Water and Air-cooled for Aero & Motor Engines

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,

Atlas Works :: Grove Street,

BIRMINGHAM.

ALUMINIUM AND IRON FOUNDERS.

MOSS-

AERO-ENGINE GEARING

Manufactured on principles ensuring greatest

STRENGTH AND ACCURACY.



GEARING—FLYWHEELS—CAMSHAFTS

R.A.F. PROPELLER BOSSES.

Our Aero parts are made in specially HIGH TENSILE STEEL, heat treated and all parts corrected for distortion.

TRANSPORT, LORRY & PLEASURE CAR GEARING

Bevel and Worm Drives accurately generated. Steering Worms and Sectors. Spur and Bevel Differentials. Gear Box Gears. Camshafts with guaranteed Glass-hard Cam Profiles.

-GEARING

THE MOSS GEAR CO., LTD.,

W. DUCKITT, Managing Director. Thomas St., Aston, BIRMINGHAM

Glue-pots

ELECTRICALLY HEATED.

Have you tried this system?

—if not, you should instal it without delay.

It is the most simple, clean and convenient. No Trouble, no Laying of Pipes, etc., as with Gas Stoves or Fires NO DANGER from flames Just a touch of the Regulating Switch and heat is applied and maintained at required High, Medium, or Low Pressures, and instantly cut off.

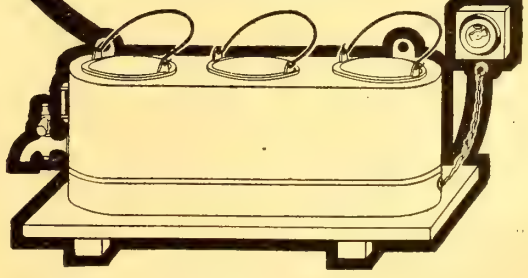
SINGLE, DOUBLE or TRIPLE POTS

supplied. Solid Copper Water Bath, with Water Level Gauge, Cast Iron Pots. Also made to special requirements in any size and for total immersion work. For all AEROPLANE and MUNITION works we give

PROMPTEST DELIVERY

—also for Dockyards, Railways, Engineers, Pattern Shops. Write us at once for full details.

PREMIER ELECTRIC HEATERS, Ltd.,
258-260, BRADFORD STREET,
BIRMINGHAM.



and Mrs. Fred W. Carling; of Ottawa, Canada. He was 20 years of age.

CHEERS.—Sec. Lt. Donald Heriot Anson Cheers, R.A.F., who was killed accidentally while flying in Scotland on April 17th, joined the Army when only 15 years old, and in August, 1915, was sent to France. He was given a Commission as Sec. Lt. in June, 1917, and entered the Royal Flying Corps.

GEOPEL and WARDELL.—The machine which Serjt. Geopel and Pte. Wardell were flying at the Curragh on May 4th fell to the ground in flames. Both men were killed.

KEARNEY.—Lt. Norman Charles Kearney, R.A.F., who was killed in an aeroplane accident on April 27th, in Hants. He was 26 years of age.

LOWRIE.—Lt. Victor Wm. Volette Lowrie, R.A.F., who died on April 27th as the result of an aeroplane accident, was the only son of Mr. and Mrs. Alfred Lowrie, Lynwood, Radyr. He was 18 years of age.

McDONALD.—Lt. G. O. McDonald, R.A.F., was drowned in the Thames at Reading on May 2nd owing to the capsizing of a canoe.

MOONEY.—An inquest was held in Surrey on April 24th concerning the death of Lt. Thomas Frederick Mooney, American Air Service, whose death was announced last week. He was 23 years of age and his home is in Texas. The evidence showed that whilst flying across the district at an altitude of about 500ft. he endeavoured to climb up, but lost flying speed, probably owing to engine trouble, and crashed to earth. He dropped into a railway cutting about fifty yards from the mouth of a tunnel, and was killed instantly. The machine afterwards caught fire and was destroyed. The jury returned a verdict of accidental death.

THOMAS.—Lt. John Dobson Thomas, R.A.F., who was killed in a flying accident in Hampshire, was a son of Mr. J. J. Thomas, formerly of Messrs. Losh, Wilson, and Bell's iron-works, Walker, Newcastle-on-Tyne, and latterly connected with iron and steel works in America, and Mrs. Thomas, and grandson of the late John Dobson, R.A., architect, of Newcastle-on-Tyne. He had graduated at St. John's Military Academy and the University of Wisconsin, U.S.A.

TUNBRIDGE.—Lt. R. G. Tunbridge, R.A.F., of Great Yarmouth, was killed in a flying accident on the north-east coast on May 2nd. The wings of his aeroplane collapsed and the machine crashed to earth.

WHITEHEAD.—Sec. Lt. Eric Joseph Whitehead, R.A.F., who was accidentally killed whilst flying on May 3rd, was the eldest son of Mr. and Mrs. Joseph Whitehead, 16, Belvedere Grove, Wimbledon.

YOUNG.—An inquest was held on May 4th on the body of Sec. Lt. F. J. Young, R.A.F., whose parents live at Chelmsford. The deceased, who was 18 years of age, left his aerodrome to fly to another town, but, missing his way, he descended for information. Rising again at Broad Marston, near Stratford-on-Avon, his machine struck an elm tree and fell, bursting at once into flames. It is thought that an injury to his head rendered him unconscious before he reached the ground. A verdict of accidental death was returned.

Engagement.

PARNELL—CHINNERY-HALDANE.—The engagement is announced of Capt. Ivan William Parnell, R.A.F., son of the late John Parnell, of Rainsbrook, Rugby, and Mrs. Parnell, Tower House, Hillmorton, to Dorothy, younger daughter of Mr. Vernon Chinnery-Haldane, of Onich, Inverness-shire, and of Mrs. Vernon Chinnery-Haldane.

Marriages.

RAWLINSON—BATTEY.—On April 30th, at the Parish Church, New Malden, Lt. Arthur Stanley Rawlinson, R.A.F., youngest son of Mr. and Mrs. Rawlinson, Edge Hill, Liverpool, was married to Dulcie, the only daughter of Mr. and Mrs. Battey, Chestnut Grove, New Malden, Surrey, by the Rev. Canon Challacombe.

STAMMERS—SPENCER.—On May 1st, at St. Matthias Church, Richmond, Surrey, Maj. H. V. Stammers, R.A.F., second son of Mr. and Mrs. S. J. R. Stammers, of Beaconsfield, Gunnersbury, was married to Alice Margaret, only daughter of the late Mr. J. E. H. Spencer and Mrs. Spencer, of 18, Montague Road, Richmond, by the Rev. T. W. Moulton, vicar of Turnham Green.

STARLEY—PARTON.—On April 27th, at the Wesleyan Church, Putney, S.W., Capt. R. Douglas Starley, M.C., R.A.F., youngest son of the late John Kemp Starley, of Coventry, was married to Frances Dorothy, only daughter of Mr. and Mrs. James Parton, of Putney, S.W., by the Rev. George Baxendale, B.D., B.A.

Births.

BERESFORD.—On April 30th, the wife of Capt. Tristram de la Poer Beresford, R.A.F., of a son.

FLETCHER.—On April 28th, at 17, Eastgate, Sleaford, Lincs., the wife of Lt.-Col. J. N. Fletcher, R.A.F.—a son.

HALL.—On April 26th, at Ilford, to Dr. (née Challen) and Archibald F. Newton Hall, R.A.F.—a son (Ian).

On Empty Spaces

YOUR advertising space may be full of matter—and yet it may be *empty* so far as pulling power is concerned. The biggest space in the finest medium in the world is valueless until you've filled it with the right copy.

The right copy is the kind that get results—results are the only criterion.

Knowing the how and why, not of advertising but of the advertising of the Aircraft Industry, is the mark at which the Meerloo Publicity Service aim.

We are responsible for a large number of the most successful Aircraft Publicity Schemes.

Look through this issue of "The Aeroplane"—you can see at a glance those advts. for which the Meerloo Publicity Service are responsible.

Let us show you what we can do on your proposition.

The
Meerloo Publicity Service
166, PICCADILLY, W.
'Phone :: :: :: Gerrard 659.

Light Steel Stampings for Aeroplanes

Any size or weight: Rough or machined: Single Piece or Combination pressed & welded by Oxyacetylene & other processes

Joseph Sankey & Sons Ltd.
Hadley Castle Works,
Wellington Shropshire

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.



FIRST IN 1880 FOREMOST EVER SINCE.

PROMPT DELIVERY AGAINST "A" CERTIFICATE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,
NEW CROSS, LONDON, S.E.

The Seal of Security
for aero engine joints
is
L'Hermetic

It securely seals joints against penetration by air, water, grease, dirt and dust. It is heatproof and insoluble in all spirit, oil and fatty essences.

The French military authorities and all leading French aero engine manufacturers use L'Hermetic by reason of its thorough efficiency and marked superiority over substitute compositions.

Sample Tin gratis to Aero Engine Builders.

MESTRE & BLATGE,
20, Store St., London, W.C.1.
Telephone: Museum 1220-1. :: ::
Telegrams: "Mesblon, Westcent, London."
J. W. HAWKES, *Manager.*

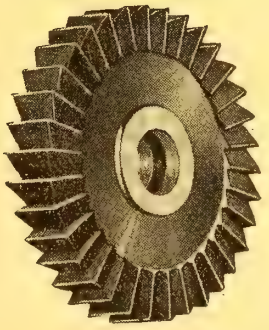


TWIST DRILLS



MILLING CUTTERS

QUICK DELIVERIES.



CENTRE DRILLS.



SEND US YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,
32, Queen Victoria St., London, E.C.4.
'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.

JOWETT.—On April 30th, at Houndless Water, Haslemere, the wife of Capt. Arthur Jowett, R.A.F., of a daughter.

KERSHAW.—On Friday, April 26th, at Ruloe, Northwich, Cheshire, the wife of Lt. Frank Kershaw, R.A.F., of a son.

KILLICK.—On May 4th, at Cooperville, Burgess Hill, Sussex, to "Betty," the wife of Lt. R. J. Douglas Killick, R.A.F.—a daughter.

SEDGWICK.—On May 2nd, at Sutton Courtenay, the wife of Capt. L. G. T. Sedgwick, R.A.F., of a daughter (Anne), who lived ten hours.

WAKEHAM.—On April 29th, at Holms, Girvan, Ayrshire, the wife of Lt. D. Gerard C. Wakeham, R.A.F.—a daughter.

FOREIGN COMMUNIQUES.

FRANCE.

May 1st.—On April 29th, Sub-Lt. Guerin brought down his twentieth aeroplane.

Army of the Orient.—Allied aviators carried out numerous bombardments. Two enemy aeroplanes were brought down in air fighting.

May 2nd.—Army of the Orient.—An enemy machine was brought down south of Ghevgeli by a French aviator.

May 3rd.—During May 2nd eight German aeroplanes were brought down, three by the Anti-Aircraft Corps. In addition, 12 enemy machines were badly damaged and fell in their own lines after encounters with our pilots.

Our bombarding forces carried out numerous operations during the day of the 2nd and the following night. Twenty-seven thousand kilogrammes (27 tons) of bombs were dropped on the stations of Ham, Nesle, Roye, Chaulnes, St. Quentin, and Jussy, and on the bivouacs and cantonments in those regions. Eight thousand kilogrammes (eight tons) of bombs were dropped on enemy establishments in the region of Rethel and on the railway station of Ashfeld La Ville.

May 4th.—Army of the Orient.—British aviators successfully bombarded enemy convoys south-east of Seres (Struma front).

May 5th.—In the course of May 3rd and 4th nine German machines were brought down by our pilots in air fighting, and two by our anti-aircraft guns. In addition, 23 enemy machines were seen to fall disabled in their own lines.

In the course of the same two days and during the night of the 3rd-4th, our bombing machines made a number of expeditions. Twenty-eight thousand kilogrammes (about 28 tons), of projectiles were dropped on the railway stations at Ham, Chaulnes, Jussy, Péronne, and St. Quentin, and on depôts and cantonments in those districts.

Army of the Orient.—Allied aviators have carried out many bombardments, and brought down two enemy machines.

GERMANY.

May 5th.—Yesterday we shot down 25 enemy aeroplanes and two captive balloons. Lt. Buckler achieved his 33rd aerial victory and Lt. Peutter his 22nd.

ITALY.

May 2nd.—Three enemy aeroplanes were brought down by our chasing machines over Grave di Papadopoli, Cimadolmo, and Fontanelle (all on the Piave front). Two more were hit by British aviators. One of them fell in the neighbourhood of Fonzaso (six miles west of Feltre), the other at Santa Lucia di Piave.

May 3rd.—Over the whole front there was intense aircraft activity; reconnaissances were carried out and air combats took place; eight hostile machines are reported destroyed.

May 4th.—A number of aircraft actions were carried out on our part, the enemy attempting in vain to oppose them by violent anti-aircraft fire and by the activity of his chasing flights. The hutments in the Val d'Assa were hit with 60 bombs by British aviators. One of our airships dropped one ton of explosives on the aviation ground at Campomaggiore (south of Sedico, eigh

HIDE GLUES FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

BLACK ENAMEL.

AEROPLANE GREY PAINT (flat). Oil and Petrol Resisting.

TRANSPARENT WOOD FILLER.

Subject to A.I.D. Inspection.

HARLAND'S

VARNISHES, ENAMELS AND FINE COLOURS.

By Appointment to His Majesty the King

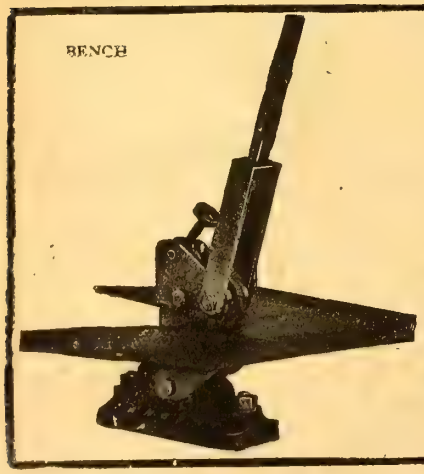
MERTON, LONDON S.W.19.

ESTABLISHED 1791.

COPAL VARNISHES for AIRSCREWS and EXPOSED WOOD PARTS, &c.

WHITE DOPE RESISTING PAINT.

Subject to A.I.D. Inspection.



TANGENT SHEET METAL SHEARING APPLIANCES

PATENT

Self - Feeding. Fast - Cutting.

Blocks illustrate a combined portable and bench tool for sheets up to 3/32" steel, and 1/8" softer metals.

Other types also made, including portable hand tools for Corrugated Iron.

WRITE FOR DESCRIPTIVE PAMPHLET

MONTGOMERY, SMITH & CO. LTD.

Patentees and Manufacturers.

TANGENT WORKS, KEYNSHAM, SOMERSET.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

W. G. TARRANT.

CONTRACTOR TO THE AIR BOARD.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

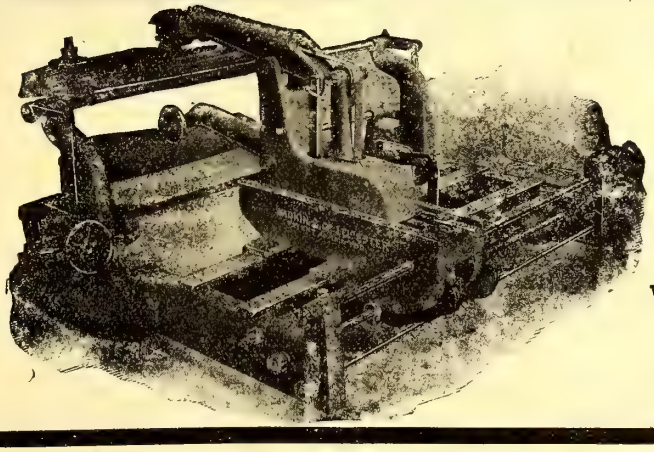
LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

AERO-PLANE STEEL PARTS

When requiring Aeroplane Parts write US — we can supply —
Tubes & Tubular Construction, Sheet Metal Pressed Parts, Wheel Rims, Special Sections in Steel, Brazing, Acetylene and Electric Welding, etc.
Any Special Parts made to order. Send your enquiries.
The LOMBARD Rim and Tube Co., Birmingham.

AUTOMATIC PROPELLER SHAPER K.E.

As supplied to all the leading propeller makers.



Every blade identical.
Less balancing required
Saves labour.
Increases output.
Write for list of users.

WADKIN & CO
LEICESTER.
Telegrams: "Woodworker."
'Phone: 3614/5.



miles south-west of Belluno). Twelve hostile machines were brought down, and one forced to land by our own and British aviators, while another was hit by our anti-aircraft guns, and fell in flames near Spresiano (Piave).

May 5th.—The activity of our aircraft was intense. Caproni flights and British aeroplanes, protected by a number of chasers, dropped about nine tons of bombs on the hydro-electric works at Cavedin (north of Mori, Lake Garda). While this operation was in progress other machines renewed the bombing of the aviation ground at Campomaggiore (south of Sedico).

Last night our airships, reaching by surprise the railway stations of Primolano (Brenta) and Bolzano (probably Belzano, north of Belluno), dropped there their loads of bombs with good effects. At the same time, an airship of the Royal Navy engaged enemy columns on the march beyond the Tagliamento.

Eight enemy machines are reported destroyed, two of which fell in flames within our lines.

May 6th.—On the 4th inst. at dawn our aviators bombed military objectives south of Fieri (the Austrian advanced base in Albania).

As the result of the offensive and defensive activity of our air forces at sea, and in the direction of the enemy coast, an air fight took place on the 4th instant in the Gulf of Trieste. Three enemy seaplanes were brought down, and it was found possible to tow two of them back to our base. All our machines returned undamaged.

BELGIUM.

April 30th.—Later information shows that two German aeroplanes were brought down by our aviators on April 25th.

May 3rd.—One German aeroplane was brought down in air fighting and crashed between the enemy lines and our own.

TURKEY.

May 1st.—One of our aviators brought down two enemy aeroplanes at Amman, the occupants of which, consisting of four British officers, were taken prisoners.

THE WAR IN REVIEW.

A Significant Admission.

In an article on Rittmeister von Richthofen, the "Frankfurt Zeitung" says:—"Superiority in the air has been the gre boast and the great hope of our enemies since 1916. They th attained superiority in the air in the numbers of their aeroplan and they have continually increased it. They have always flo up in the thickest swarms, and fallen upon us to win in t air the victory which they hardly any longer believed attainal on the ground. Our little Germany has not been able to ke pace with this totality of the greatest and richest countries of t world. Therefore, we shall never reach the number of their ae planes, whether American help increases it still more or leav them further in the lurch."

The Death of an Ace.

It is reported the Capt. Mahieu, the well-known French milit pilot, is missing after a night expedition.

American Aircraft Finance.

A Reuter's report from Washington on May 6th stated th the War Department has asked Congress for a billion doll (£200,000,000) appropriation for aircraft production in additi to the 640 million dollars (£128,000,000) already expended.

American "Archie" Work.

Reuter's correspondent with the American Army in Fra writes on May 6th:—

Our anti-aircraft guns brought down one enemy aeroplane a damaged another in this sector.

Anti-Aircraft Work.

Italian anti-aircraft artillery on the Lower Piave have brou down a large Austrian seaplane, K 388 (presumably a "Kapp type machine), capturing three officers, two of whom were ba wounded.

OFFICIAL ACCEPTANCE TESTS

LAND MACHINES.

S.P.A.D.	*Avro*
Sopwith	*Armstrong-Whitworth*
B.E.	*D. H. 4.*
Short	*Handley-Page*
Curtiss	*Bristol*
Mann, Egerton	*Vickers*
M. Farman	*Nieuport*
H. Farman	*Supermarine, &c.*
Morane	

SEAPLANES.

Short, Sopwith, America Boats, F.B.A. Boats, Curtiss Boats, Norman-Thompson, A. D. Boats, &c.

Private Aerodromes Surveyed and Pilots' Reports Furnished.

DELIVERY AND EXPERIMENTAL FLIGHTS

ON LAND MACHINES & SEAPLANES.

COMPLETE REPORTS FURNISHED.

Rates on application to

THE PRODGER - ISAAC AVIATION COMPANY

(C. B. Prodger and Bernard Isaac),

166, Piccadilly, London, W.1.

Telephone: *Gerrard* **278** (*2 lines.*)
Telegrams: "Aeromnia, *Piccy, London.*"

CLIFFORD B. PRODGER

J. LANKESTER-PARKER

and other Pilots.

Approved Admiralty Pilots — for Acceptance Trials. —

INSURANCE.

WE are now in a position to quote low rates, through our brokers at Lloyd's, for the Insurance of Aircraft during ACCEPTANCE TRIALS AND DELIVERY FLIGHTS with an excellent and most comprehensive Policy. May we quote you for your new contracts?

SPECIAL ARRANGEMENTS with Sub-Contractors for HANDLEY-PAGE Type Land Machines or "AMERICA" Type Flying Boa

EBORA PROPELLER Company 11 & 12 Surbiton Park Terrace KINGSTON on Thames Telephone KINGSTON 672 Telegrams EBORA, KINGSTON

Ebora Propellers

Contractors to the Admira and War Offic
SCHOOL PROPELLE
FOUR BLADERS
SEAPLANE PROPELL
SLATE TABLES F
PROPELLER WOR

Lang Propeller LTD.

Contractors to the Admiralty a d War Office.

WEYBRIDGE, SURREY.

Telephone—Works: East 3832, 3833 Offices: 3474 Gerrard. Telegraphic Address—"Extouboul, London."

THE STANDARD Aircraft Manufacturing Co., Ltd.

CONTRACTORS TO H.M. ADMIRALTY AND AIR BOARD.

Head Office: SAVOY HOUSE, Corner of Savoy Street, STRAND, W.C.2.

Works: 28, BOW COMMON LANE, LONDON, E.3.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Contractors to H.M. Government.

SWIFT
AVIATION CO.

Engine Plates in Stock,
Complete Sets.

Speciality Sopwith Spares.

KINGSTON

'PHONE—
62 KINGSTON

'GRAMS—
"SWIFT, KINGSTON"

Bowden.
Controls, AND Cables FOR Aeroplanes

Suitable for all possible purposes.
Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD.,
TYSELEY, BIRMINGHAM.

BOWDEN TYSELEY Tyseley. BOWDEN TYSELEY

B.H.B.

AIRCRAFT DEPARTMENT



WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

British Metal (Kingston) Ltd
The Factory,
Kingston-on-Thames.

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, DE H.
RESIDENT A.I.D. EXAMINER.



Large numbers of these three types have been supplied.

IMPERIAL LIGHTS
— FOR —
AERODROME LIGHTING

IMPERIAL LIGHT LTD.,
123, Victoria Street,

Telegrams—
"EDIBRAC, PHONE, LONDON."

LONDON, S.W.1.

Telephone—
VICTORIA
3540
(3 Lines)

Bowden Wire Ltd.

TRADE MARK

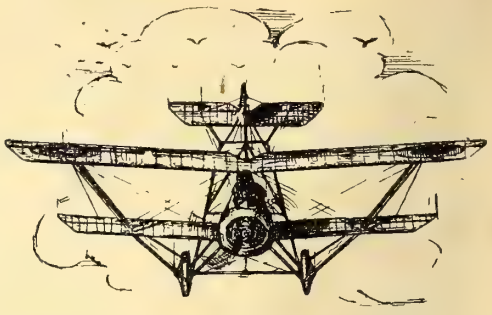
London

THE varied uses and adaptations of the world-famous Bowden Wire mechanism and controls are recognised by almost every department of State Service. The war work which we have in hand for Home and Allied Governments precludes for the present our acceptance of private orders.

Established 1897.

Victoria Road, Willesden Junction, N.W. 10.

Wires:— "Carbon," Cambs. 'Phone:— Cambs. 5.



Special arrangements to assist Enlistment of PILOTS in the

NEW AIR FORCE

Write for particulars before vacancies are filled to—

The CAMBRIDGE SCHOOL OF FLYING

and AERODROME CO., Ltd.,

30b, St Andrew's Street, Cambridge.

A REMINDER. in **Aero-Engineering**; for **Manufacturers.**

The School also conducts:— (1) **Correspondence Course** (2) **Drawing Office Service**

PROPELLERS ONLY.

W. D. ODDY & Co

LEEDS.

CONTRACTORS TO H.M. GOVERNMENT

S.B.A.C. The Society of British Aircraft Constructors

Office & Works—

Propeller Works, Balm Road, Hunslet, Leeds.

Telephone— Central 291.

Telegrams— Airscrews, Leeds.

Telegraphic Address: POETRY, 'PHONE LONDON.
Telephones: AVENUE 995, 996, 7996.

(Partners: H. W. PRITT, W. G. PRITT, P. W. SMALLWOOD, E. R. HILL),

PRITT & CO.

METAL WAREHOUSEMEN, MUNITION AND AERONAUTICAL CONTRACTORS

46, FENCHURCH STREET, LONDON, E.C. 3,

Where all communications must be addressed.

CITY WAREHOUSES: 62a & 64, Vine Street, Minories E.C.

DEPOTS: Paddington, Poplar, Shoreditch.

We hold good stocks, complying with Air Board, R.A.F. and Admiralty Specifications, of the following:

BRASS & COPPER in sheets, tubes, rod, wire, etc.
TINNED STEEL SHEETS.
MILD STEEL SHEETS, 9a.
BRIGHT DRAWN MILD STEEL BARS, 3a.
A. G. S. BOLTS, NUTS AND WASHERS.
COPPER RIVETS. TINMAN'S SOLDER.
SOLDERING IRONS.
BEST SWEDISH WELDING WIRE.
BRAZING SOLDER in wire and granulated Form.
SILVER SOLDER. WIRE GAUZE, &c.

All material passed A.I.D. before despatch.

DAILY DELIVERIES made by our own vans within a radius of 15 miles of our Warehouses.

NOTE.—All orders for Aeronautical Work receive especially prompt attention.

WE ARE BUYERS OF SCRAP BRASS & COPPER.

R. F. & F. W. BROWN

(F. W. BROWN.)

Wollaton Saw Mills
Near Nottingham

ENGLISH ASH FOR AEROPLANES

Bent Timber Manufacturers.

Telephone .. 1526 Nottingham. Telegrams .. Browns, Sawmills, Wollaton.

The LARGEST and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.

School Approved by R. Ae. Club.

PUPILS COACHED FOR THE AIR SERVICES.

Particulars from BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.

A.G.S. WASHERS

Turn Buttons.
Eyelets.
Washers.

Wire Work.

THIMBLES

UNION NUTS & NIPPLES.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

"NOVELLON" DOPE

AND AEROPLANE VARNISH.

CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED.

Telegrams: *Cellutate, London.*

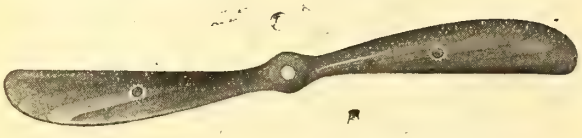
8, WATERLOO PLACE, S.W.1. *Phone: Regent 4045.*

Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

THE

BRITISH WRIGHT

CO. LTD.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

Manufacturers of

AERONAUTICAL INSTRUMENTS

FOR

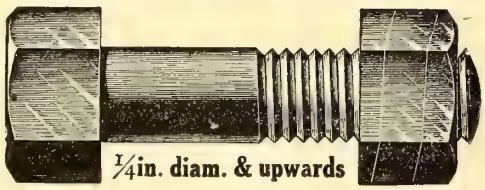
NAVY & ARMY AEROPLANES

Ogilvie Air Speed Indicators
For use on Aeroplanes, Airships, Kite Balloons and Air Stations.
Statoscopes.
Recording Manometers.
Wind Speed Recorders.

At present the Government is taking the entire output, but British and Foreign Firms are invited to place their orders now for delivery of Aeronautical Instruments after the war.

The BRITISH WRIGHT Co. Ltd.
33, CHANCERY LANE, LONDON, W.C.2.

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

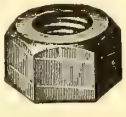
THE

"HELICOID" LOCK-NUT

(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ¼in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

CONTRACTORS TO H.M GOVERNMEN

W.T.CLARK & CO



Telephone No. Central 2121.

5, GREEN TERRACE, ROSEBERY AVENUE, LONDON, E.C.1.

Telegrams Etalspinne Islington London Two Words

METAL SPINNERS

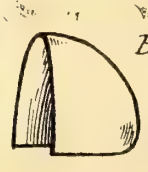
and

SHEET METAL WORKERS

for Aeroplane Constructors

METAL SPINNINGS for AEROPLANES

Cowlings (COMPLETE SET)
Coverings
Undershields
Fairings
Petrol Tanks
Shields etc.



BEATEN COWLS OF EVERY DESCRIPTION

SPUN COWLS UP TO 48 INCHES IN DIAMETER.



SHENSTONE & Co., LTD.
AIRCRAFT DEP.
LEYTON.

AIRCRAFT PRODUCTION WITH MODERN METHODS.

E. KEITH DAVIES, General Manager. Telephone: WALTHAMSTOW 24.

THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

PLYWOOD

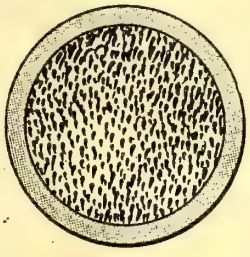
IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.

Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

ANTOL CASE HARD



Harden your Screws and Gauges with **ANTOL.**
IT LEAVES NO SCALE.

PIDGEN BROS.

5, Helmet Row, Old St., London, E.C.1

NOTICE!

Important to Aircraft Firms.

MANUFACTURER with every facility for expansion requires steady supply of orders for Metal Fittings (press and hand made). Samples of Parts already produced sent on receipt of card.

WILLIAM MILLER, Maker of Metal Aero Fittings, Tools, Dies, Stampings, Time Checks, Labels, Marking Punches, Stencils, Military Ornament, Works' Badges, Enamels, etc.,

21, HYLTON STREET, BIRMINGHAM.
'Phone: CENTRAL 1240.

Branch Works: 13½, Gt. Hampton St., Birmingham.

Aeroplane Steel Sheets

as supplied by us to

The Royal Aircraft Factory

and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A Specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

IRON AND STEEL WAREHOUSE
SMETHWICK, BIRMINGHAM

Telegraphic Address: "Bernico," Birmingham. Telephone No.: 224 Smethwick.

THE POOLE AVIATION CO.

POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

Aluminium Castings



Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

Contract to H.M. Government
Chill Castings for Aeroplanes a Speciality.

Telephones: 3846 City. 4879 Central.
Telegrams: Krankases, Isling London

R. W. COAN
The Aluminium Foundry
219, COSWELL ROAD, LONDON, E.C.

COAN CASTS CLEAN CRANK CASES

The Air Navigation Co., Ltd.

BLERIOT & SPAD AIRCRAFT WORKS,

ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director.

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge

EYE BOLTS.



The CARLETON MFG. Co., Ltd.
Brighton Square,
573b, Moseley Road, Birmingham.

NOTICE TO AEROPLANE WORKS.

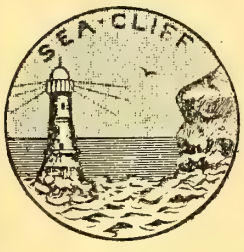
SUPPLIES OF 'CROID' LIQUID GLUE

The necessary additional plant having been obtained, the output of "CROID" Liquid Glue for Aircraft Construction, etc., has now been largely increased, and delays in the despatch of supplies will not, it is anticipated, arise from shortage, as has lately been the case.

THE IMPROVED LIQUID GLUES COMPANY, LTD
Great Hermitage Street and Bushell Street, London, E.
Telephone: Avenue 3178. Telegrams: Excroiden, 'Phone, Londo

Manufacturers of

PHOSPHOR BRONZE,
GUN METAL,
MANGANESE BRONZE,
BRASS & COPPER,
TUBES, SHEETS, RODS, WIRE, AND
CASTINGS.
PHOSPHOR TIN,
PHOSPHOR COPPER.



CHARLES CLIFFORD & SON, LTD.,
BIRMINGHAM.

SALMSON AERO-ENGINES

(Canton-Unné System).

All enquiries should be addressed to

THE DUDBRIDGE IRON WORKS, L
STROUD,
GLOUCESTERSHIRE.

London Office:
87, *Victoria Street, S.W.*1,

"FREMO" TAPER PINS

Why not allow us to carry all the responsibility which rests, and must rest, upon the taper pin?

We have given our product a name in order that we may do so. It is our way of proving the confidence we have in that which we made.

FRED^K. MOUNTFORD (B'ham.) Ltd.
Fremo Works, Lifford,
BIRMINGHAM.



TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 5912. E. H. Godbold, Director
GODBOLDS

Phone: Putney 737. Established 1912.
ROPOR'S
Aeroplane and General Sheet Metal Works.
ENQUIRIES INVITED FOR WORK
Open to quote for work for immediate delivery.
COWLS, TANKS, UNDERSHIELDS, FAIRINGS.
Hammered Work in all Metals.
Experimental and Special Work Undertaken.
347a, New Kings Road, Fulham, London, S.W.6.

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

Clegg Metal Engraving Co.
Chatsworth Works, Worthing,
For Dials, Scales, Name-plates and Address Plates, and Instruction Plates, in Metal, Ivorine, Etc.
Either Chemically Engraved or Machined.

ALWIN ENGINEERING CO., AERONAUTICAL ENGINEERS,
A. E. CARTLIDGE. LUTHER ROAD, TEDDINGTON, S.W.
Tel. No. Kingston 2412.
ALWIN TRADE MARK
Makers of all kinds of Aircraft Fittings.
Presswork a Speciality,
Pressings for DeH, etc.
Avro, Sopwith, Fairey and many other types.
On receipt of Post Card our Representative will call and give immediate quotation.

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

BRAZING AND SILVER :: :: SOLDERING.
J. W. KING,
36, ST. JOHN'S SQ.
LONDON,
E.C.1.
TELEPHONE - - CITY 5238.

Clean Coloured Rags
FOR CLEANING & WIPING.
Best and Cheapest for Munition Works :: Engineers, Printers & Bus Companies, etc.
A. JOSEPH, EARL STREET, LONDON ROAD, LONDON, S.E. 1.
Telephones: Hop 8[illegible], 361 & 4272. "Cheaper than cotton waste."

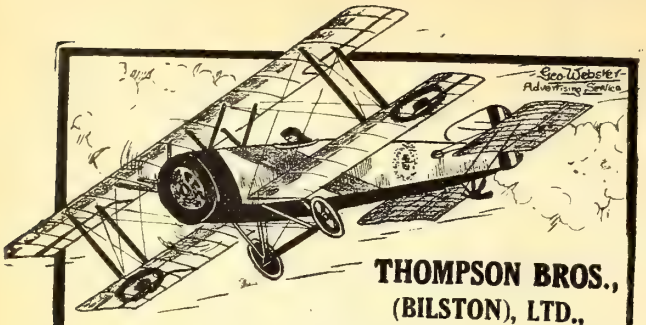
P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: **Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work.** Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices & Works: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

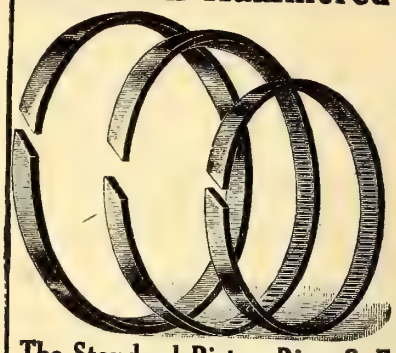
SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.



THOMPSON BROS.,
(BILSTON), LTD.,
— FOR —
UNDERCARRIAGES
TUBULAR FRAMEWORK
AERO. DEPT. BILSTON, Staffs.

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process.
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.
Telephone No. 2149.
Telegrams—"Ocean," Sheffield.
The Standard Piston Ring & Engineering Co., Ltd.
Premier Works, Don Road, Sheffield.

THE
"BOWSER" AEROPLANE SEATS
(Made to A.G.S. Drawing 264).
Supplied to the Royal Aircraft Factory and the Leading Aircraft Manufacturers.
Manufactured by EDWARD BOWSER, 50, Park Lane, Leeds. Tel. No.: Central 3473.
Under the A.I.D. Inspection
Northern Representative—
Mr. WALTER M. DANIELL,
33, East Beach, Lytham.

Enquiries invited for Metal & Wood Aeroplane Parts & Units. Covering & Doping.
The Burton Aircraft & Manufacturing Co., Ltd., PARK STREET, BURTON-ON-TRENT.

MISCELLANEOUS ADVERTISEMENTS.

SPECIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMEN in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per l For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W

PATENTS.

PAGE & ROWLINGSON, Chartered Patent Agents (Consulting Engineer, Mr. S. E. Page A.M.Inst.C.E.), 27, Chancery Lane, London, W.C. Tel. 332 Central.

Henry Skerrett, Chartered Patent Agent, 24, Temple Row, Birmingham.—Patents, trade marks, and designs.

Inventors advised free. Write for booklet.—King's Patent Agency, Ltd., 165, Queen Victoria Street, London. 30 years' references.

Stanley, Popplewell and Co., Patent Agents and Consulting Engineers. Applications for Patents attended to in all countries.—38, Chancery Lane, W.C. Telephone: 1763 Central. Circular free.

SITUATIONS VACANT.

Skilled Turners required for large Midland factory. Men used to aeroplane engine work need only apply. No persons already engaged on Government work will be accepted. State age, experience, and salary required. Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3536.

Wanted Capable Engineer, must be able to take charge of a job under works manager's direction. Practical man essential. No person engaged on Government work or resident more than 10 miles away will be engaged.—Palmer's Garage, Tooting, S.W.

First-class Draughtsman wanted for post near London as checker of jig and tool work. Must be experienced and reliable. No person already on Government work will be engaged.—Apply your nearest Employment Exchange, mentioning this paper and No. A5096.

Required at once, Assistant Draughtsman for detail work and quantities, preferably one used to aircraft work. Good wages and conditions. One hour from London. No person already engaged on Government work will be engaged.—Applications should be made through your nearest Employment Exchange, mentioning this paper and No. 3542.

Large number of Aircraft Fitters wanted, with experience of assembling engines into complete machines. Full rate and war bonus. No one living more than 10 miles away or on Government work will be engaged.—Write, Box 348, Sells, Ltd., 168, Fleet Street, E.C.4.

Wanted at once for work on Handley Page machines in aircraft factory, London, N.W., a number of aeroplane erectors and assemblers; engine nacelle assemblers, and viewers on final erection. There are also vacancies for sheet metal workers for petrol tanks and cowling, coppersmith for pipe work, and panel beaters. Full district rate and war bonus paid in all cases. No one on Government work or living more than 10 miles away will be engaged.—Write, Box No. 3556, THE AEROPLANE, 166, Piccadilly, W.1.

Experienced Man required to take charge of finished wood parts, stores in large aeroplane works in N.W. London. No one engaged on Government work or living more than 10 miles away need write to Box 349, Sells, Ltd., 168, Fleet Street, E.C.4.

Works Superintendent wanted immediate an aircraft factory on the South Coast. be thoroughly experienced in the asse erection, and completion of machines, an able to control men tactfully but very fi No one already engaged on Government need apply.—Apply, in first instance, st age, experience, and salary required, to nearest Employment Exchange, menti this paper and No. 3552.

Charge Hand wanted immediately for a aircraft factory on the South Coast. Mu a really first-class man to take direct co under the general foreman of the ere shop, and able to supervise and check through all details of machine erection; capable of controlling and leading men. first-class applications will be considered. one already engaged on Government need apply.—Give fullest particulars of qu cations and salary required to your ne Employment Exchange, mentioning this p and No. 3553.

Inspector wanted for a new aircraft factor the South Coast. Must be a first-class ex enced man; thoroughly used to the asse and trueing-up of planes and erectio finished machines; also able to inspect det workmanship during general progress of w No one already engaged on Government need apply.—Give fullest particulars of q fications and salary required to your ne Employment Exchange, mentioning this p and No. 3554.

Works Manager for London engineering craft works (metal fittings, sheet metal w on direct Government contracts), capable taking entire charge of works; experienc reliable. State terms, references.—Box 3531, THE AEROPLANE, 166, Piccadilly, W.

ATIONS VACANT—continued.

ed immediately, 100 aeroplane erectors o aeroplane assemblers for aircraft fac- n the North of England.—Applications nade to your nearest Employment Ex-, quoting the number of this advertise- A.5204.

e Assistant required in technical depart- of large aircraft factory. Young and ic. Previous aeronautical or engineer- perience essential. No person already d on Government work need apply.— ations must be made through your Employment Exchange, mentioning per and No. 3588.

ne Models.—Engineers wanted for scale models of aircraft. Excellent op- ty for men of right class and good No one on Government work should Applicants must give fullest particu- to age, experience, and salary required. through nearest Employment Ex- mentioning this paper and No. 3587.

uperintendent wanted for large aircraft in Yorkshire. While some knowledge aft construction is essential, discipline ganising power are even more impor- No person already engaged on Govern- ork will be appointed.—Reply, giving perience, and salary required, to your Employment Exchange, mentioning er and No. 3580.

gineering Firm in South London, en- on aeroplane metal spares, requires an r for estimating and costing; good will be paid to capable man. No one engaged on Government work or re- nore than 10 miles away will be con- —Apply, stating age, experience, and equired, to Box No. 3579, The Aero- 66, Piccadilly, W.1.

and experienced draughtsman wanted and tool design on high-class repeti- rk, near London. No person already ernment work will be engaged.— stating age, experience, and salary re- to your nearest Employment Exchange ing this paper and No. A.5160.

nced Aircraft Fitters, Tool and Jig Plane Erectors, required at once. No ngaged on Government work or resi- ore than 10 miles away need apply.— rticulars to Worms Aircraft Construc- , Ltd., Bournemouth.

r Draughtsman, with technical and osting knowledge, aero engine experi- referred; good prospects for keen No person already on Government ill be engaged. Apply to your nearest nent Exchange, mentioning this paper A.5171.

tsmen required, with experience of e work and jig designing, etc. No present engaged on Government work engaged.—Apply to your nearest Em- t Exchange, mentioning this journal 3576.

Managers and **Foremen** required at an e assembling works now in construc- Previous experience desirable, though ntial. No one at present employed on ent work will be engaged.—Apply to Employment Exchange, mentioning nal and No. 3575.

er required to prepare and carry a scheme of training workers for ng of aeroplanes. Live man, with ganisation record, and used to Labour e methods and handling of men and No one at present employed on ent work will be engaged.—Apply to Employment Exchange, mentioning nal and No. 3574.

l Expert required for new aeroplane capable of handling inspection depart- awing office, and quality and detail t. Good salary will be paid to the an. No one at present employed on ent work will be engaged.—Apply to Employment Exchange, mentioning rnal and No. 3573.

Sheet Metal Work Foreman wanted, used to aeroplane work. Good organiser and mechanic. No one already engaged on Government work or resident more than 10 miles away need apply.—Write, Z. T., 990, care of Deacon's, 7, Leadenhall Street, E.C.3.

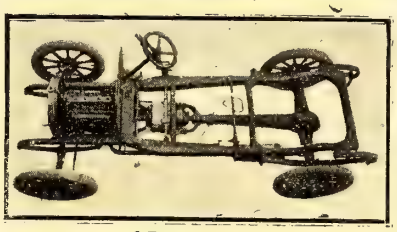
First-class Practical Sheet Metal Workers wanted, thoroughly used to aircraft petrol pressure and gravity tanks, cowlings, and all sheet metal work, by Government controlled establishment. Top rate of pay for good men. No one residing more than 10 miles away or already engaged on Government work will be engaged.—Box No. 3569, The Aeroplane, 166, Piccadilly, W.1.

FOREMEN
and PRODUCTION
MANAGERS
REQUIRED

to inaugurate departments at our new works. Good opportunity for men with knowledge of sheet metal working in all its branches. Must have initiative and be used to dealing with Trade Union labour. Preference given to men who have been used to aeroplane sheet metal work or similar occupations. No one residing more than 10 miles away or already engaged on Government work need apply.

Apply—**L. T. DELANEY,** *Managing Director.*
GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.1.

PALMER'S GARAGE & TOOTING ENGINEERING WORKS,



12-14 h.p.
FIAT CHASSIS FOR NATIONAL SERVICE.
PRICES, with new tyres:—
3-speed model, **£125** 4-speed model **£150**
IMMEDIATE DELIVERY.
These chassis are the best value obtainable and run 25-30 miles per gallon of petrol.
Write for Catalogue of Fortnightly Auction and for details of my **F.I.A.T.** Secondhand Cars, La daulets, Vans, Lorries, 2 and 4 Seaters, etc.
AUCTION SALE EVERY FORTNIGHT.
Entries invited.
Next Sale, **THURSDAY, 9th May,** at 2 o'clock.
Catalogues sent free on application.
PALMER'S GARAGE, TOOTING.
'Phone: 208 Streatham.
CARS BOUGHT FOR CASH.

Foreman Builder wanted to take charge of constructing buildings, both temporary and permanent; must be first-class practical and competent workman to work plans, by large Government controlled establishment. London area. No one already engaged on Government work or residing more than 10 miles away need apply.—Box No. 3570, The Aeroplane, 166, Piccadilly, W.1.

Engineer, electrical and mechanical, experienced in works management, with knowledge of modern economical methods of production for quantity output. Motor and aeroplane parts. Must be good organiser, for growing business, tactful, and able to handle men. Knowledge of markets for materials and parts Accurate costing. Excellent prospects for suitable man. Write, stating experience, qualifications, position re military service, and salary required. London area. No one already engaged on Government work or residing more than 10 miles away need apply.—Box No. 3567, The Aeroplane, 166, Piccadilly, W.1.

Cost Clerks required, with experience in aeroplane component costing. Must be capable men with ability to think for themselves. Good wages paid to the right men. No person already employed on Government work will be engaged. Must be ineligible for military service.—Apply, with full particulars, age, and salary required, to your nearest Employment Exchange, mentioning this paper and No. A.5191.

Clerks required for purchasing department, with experience of commercial side of aeroplane manufacture, supplies, etc. No one at present employed on Government work will be engaged.—Apply to your nearest Employment Exchange, mentioning this journal and No. 3571.

First-class Toolmaker wanted, used to jig, gauge, and templete making, for large Government controlled aircraft works. London area. Top rate of pay for good man. No one already engaged on Government work or residing more than 10 miles away will be engaged.—Box No. 3568, The Aeroplane, 166, Piccadilly, W.1.

Material Inspector required for large aeroplane work, Manchester district; practical experience of engineering and general stores materials essential; knowledge of aircraft materials an advantage. Good prospects for a capable and energetic man. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3566.

Clerk, Chief, and **Assistant** required for progress and planning department of new aeroplane factory, with experience of graphics, tabulation, capacity schedules, etc. No one at present employed on Government work will be engaged.—Apply to nearest Employment Exchange mentioning this journal and No. 3572.

SITUATIONS WANTED.

Works Manager, free to re-engage immediately. Twenty years motor, five years aero engines and planes: British, American, and Continental experience. Guarantees rapid, up-to-date and economic production. No service obligations.—Reply, Box No. 3551, The Aeroplane, 166, Piccadilly, W.1.

Draughtsman, with good mechanical aeronautical experience, is available for the preparation of drawings and tracings.—Box No. 3560, The Aeroplane, 166, Piccadilly, W.1.

Aeroplane Designer will shortly be open for engagement. Ten years' experience. Latest bombers and fighters.—Box No. 3586, The Aeroplane, 166, Piccadilly, W.1.

Machinist seeks situation to work planers' band saw tenoning and rise and fall bench.—J. T., 31, Hampton Street, Walworth Road, London, S.E.

Man, 42, ineligible for Army, seeks situation as foreman, charge hand, or capable of taking entire charge of works. Varied experience, aeroplanes, equipment, building, wood-working machines, etc., years' experience with employment and management of men. Unique methods of output and production.—Box No. 3564, The Aeroplane, 166, Piccadilly, W.1.

Smart, Energetic Man requires position as superintendent of erecting shop or general foreman. Strict disciplinarian. Used to control of men under existing circumstances; eight years' experience in the aircraft industry. Good references.—Write, Box No. 3565, The Aeroplane, 166, Piccadilly, W.1.

Thoroughly Competent Accountant (34), company secretarial experience with large firms, ineligible for military service, desires position London or provinces. Excellent testimonials.—Write, X. X., at Horncastle's, 60, Cheapside, E.C.2.

Foreman, now disengaged, seeks position. Five and a-half years' aircraft experience, tubular and metal fittings (Grade 3). Good references.—Box No. 3581, The Aeroplane, 166, Piccadilly, W.1.

SITUATIONS WANTED.—continued.

Buying Department Assistant seeks good position. Experienced.—Box No. 3578, The Aeroplane, 166, Piccadilly, W.1.

As Foreman, covering or doping. Experienced. Fin to fuselage. Energetic.—Box No. 3585, The Aeroplane, 166, Piccadilly, W.1.

Foreman Fitter on aeroplane and seaplane fittings desires position as assistant manager or position of trust. Aged 37. Practical engineer; tactful; energetic; methodical organiser. Provinces preferred.—Box No. 3584, The Aeroplane, 166, Piccadilly, W.1.

Wireworker wants small contracts out, Class A, own shop and plant.—Masterman, 4, Riseholme Street, South Hackney, E.9.

Assistant Superintendent, 16 years' technical and practical general engineering experience, including aircraft, seeks berth as assistant or works manager. Modern methods, massed production, progressive, good organiser, and tactful control of labour. First-class references, disengaged May 31st.—Apply, Box No. 3591, The Aeroplane, 166, Piccadilly, W.1.

FINANCE.

Capital.—West End firm is open to take up good debenture issue up to £100,000.—Write, Box 386, Sells, Ltd., 168, Fleet Street, E.C.4.

Advertiser, well-known in British and French aeronautical circles, with eight years' experience and first-class official and commercial connections, is open to represent British firms on the continent.—Box No. 3590, The Aeroplane, 166, Piccadilly, W.1.

Selling Agency required by advertisers, well established amongst aircraft manufacturers.—Box No. 3589, The Aeroplane, 166, Piccadilly, W.1.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1

Engineering Firm with well-equipped machine shops, now engaged on munitions, solicits inquiries for all classes of turning, drilling, grinding, milling, fitting, etc. Aircraft fittings, also copper pipe work, a speciality. Correspondence with a view to post-war business especially invited.—The Lankester Engineering Co., 39, Eden Street, Kingston-on-Thames.

Rubber Twill Cuttings, in any quantity. State average size, quantity and price required, to Aylen, 38, Sun Street, London, E.C.2.

A London Firm in South-Western district has facilities for doping and covering, in addition to woodwork of all descriptions, with a large output and guaranteed deliveries. Estimate on application.—For further particulars, apply Box No. 3535, The Aeroplane, 166, Piccadilly, W.1.

Wanted copies of The Aeroplane—whole of Vol. I.; also numbers of Vol. I. for Oct. 19th, 1911; of Vol. II., Feb. 8th, 1912; of Vol. III. for July 11th, 1912; of Vol. IV. for Jan. 23rd, Feb. 6th, and March 27th, 1913, and of Vol. XI. for Sept. 6th, 1916. Any of these numbers will be of service.—Write, stating price, to X. Y. Z., Aeroplane, 2, Bream's Buildings, E.C.

Wanted, The Aeroplane for Jan. 31st, March 14th, May 2nd, and June 27th, 1917. Sixpence each will be paid for any in good, clean condition.—A12, The Aeroplane, 2, Bream's Buildings, E.C.

Woodworking Firm (just finishing contract for flying boat parts) is prepared to undertake machining or assembling of any class of aircraft work, large works. Fully equipped with latest machinery; accurate work and prompt delivery guaranteed.—Apply, Box No. 3529, The Aeroplane, 166, Piccadilly, W.1.

Wanted immediately for cash, 1 woodworking spindle machine, French heads, and 1 over and under planer and thicknesser.—Apply, Box No. 3592, Woodworking Firm, The Aeroplane, 166, Piccadilly, W.1.

Wanted, The Aeroplane, whole vols. 8 and 9, April 12th, 1916, April 4th, 1917.—Write price to André, 22, Monmouth Street, Bridgwater.

Wanted, wirework, wire small wares, light stampings. Must be war work.—P. Hardy and Co., 338, St. John Street, London, E.C.1.

Aeroplane Parts, small or large, or accessories, any quantity; work wanted by firm, sub-contractors to leading constructors; long experience, quick service, accurate.—Box No. 3593 The Aeroplane, 166, Piccadilly, W.1.

AVIATION.

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Engineer in Aeronautics. Demonstrations from complete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTITUTE LTD.,

21a, Loudoun Road, St. John's Wood, N.W.8.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page II. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264 or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester

Cane Seats. Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

FOR SALE.

For Sale, 30 h.p. lorry chassis, in first-class condition; immediate delivery; any class of body fitted to suit customer.—The Royal Garage, 48A, Gillingham Street, Eccleston Square, London, S.W.1.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid.—Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Woodworking Plant for sale, comprising the latest type machines, laid down 18 months ago.—Apply, first instance for appointment, to Box No. 3582, The Aeroplane, 166, Piccadilly, W.1.

Aluminium Sheets, 8in. square, 22 gauge, 3s. per lb.—Thompson Bros., Ltd., Aircraft Dept., Bilston.

MISCELLANEOUS.

MAKE MONEY BY WRITI

£50 PRIZE. Send postage (2d.) ticulars and copy of "How to Ear while Learning How to write for Ne and Magazines." Practical and hensive Correspondence Courses—Fi Articles, etc. Expert Literary Constructive Criticism. Beginners how to make work saleable. E testimonials. Address "Editorial" E.M.), 22, Chancery Lane, London,

Luminous paint for wrist watche match boxes, etc.; remains lumi years. Bottles 1/9 and 2/9.—Tobi 39, Charles Street, Hatton Garden,

MODELS.

T. W. K. Clarke and Co., Ltd., partment, Hampton Wick.—Thoug full up with full-size aeroplane par we still build models as we did in 19 with Biplanes, etc., in Stock.—Send for our illustrated List, 120 item models; certain metal goods are out

Model Aeroplane, flies ¼ mile circul carriage paid, 3s. 6d. "I can th recommend your machines." T from Dr. Adams, Union Road, Thousands satisfied, testimonials parts.—Dept. C., Bristol Model Depôt, Eastville, Bristol.

ENGINEERING.

British School of Aeronautics. Engineering Course; Aero Design; struction; Aero Draughtsmanship; Engineering. — Pennington's, 254 Road, Manchester.

PUBLICATIONS.

BOOKS

By Lieut. Victor W. Page of the U.S. A

JUST PUBLISHED.

AVIATION ENGINES. Their Desig tion, Operation, and Repair. A book for Engineer, and all interested in Aviation, ised authority. Giving practical instruct and maintenance not to be found Medium 8vo. 580 pages, with over 2 tinctive and specially made Engravi Pric

GLOSSARY OF AVIATION T English-French and French-English. 100 pages, with Plates and Illustrat Pr

AN AVIATION CHART. A large showing a typical Aeroplane Power Section, with all important compone Folding to Pocket Size. Price

London: CROSBY LOCKWOOD 7 Stationers' Hall Court, E

Just published. 360 pp. with Illustrations, 6¾ in., limp cloth. Price 6/- net (postag

The Aviation Pocket Book fo

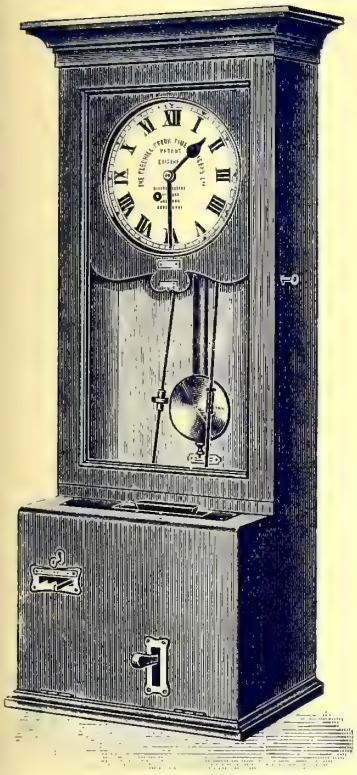
By R. BORLASE MATTHEW Assoc.M.Inst.C.E., F.Ae.S

Containing data on Aeroplane Theory a Air Pressure and Resistance, Structural Engines, Typical Aeroplanes, Piloting Meteorological Data, Scouting and Signa etc. With Glossary and other informati to all interested in Aviation.

Prospectus on Application.

London: CROSBY LOCKWOOD 7, Stationers' Hall Court, E.





The Recorder which stamps the definite minute—

IN MANUFACTURE every effort is made to produce a reliable strong machine.

Only best materials are used and the Recorders are British throughout.

WE ARE SUPPLYING H.M. Government and Government Controlled Factories, also many Aeroplane Works.

"CONCERNING COSTS" FREE.

"PRACTICAL COSTING." By A. H. Gledhill, A.M.I.M.E. 3/- Post Free.

COMBINED TIME AND JOB CARD

for recording complete labour cost.

The **"IN"** and **"OUT"** time is recorded on the card, also the time when jobs are changed.

The TIME on the Job is cast out at the side of card and the total hours entered in the Job No. column under the Job number.

Unfinished Jobs are entered at the foot with Job number and the total hours worked up to the week-end under column headed "Carried Forward," and transferred to the next week's time card in the column "Brought Forward," any time worked on this job during the second week is entered in the column, "Time for this Week." If the job is completed during the second week, the total is added and entered in the "Jobs Finished" column. If the job is not completed, the total is entered in the column "Carried Forward," which will in turn be entered on the third week's time card.

STANDING ORDER NUMBERS for constantly recurring Non-Productive Jobs are represented on the card, e.g. K.31 Grinding Tools; E.53 Making a New Lathe Tool.

SYSTEM B.

CHECK No. 315. WEEKLY TIME CARD. Week ending 18 Aug. 1916. Name Thos Johnson

Job No.	IN—ON	OUT—OFF			
	5 59 SA 8 29 SA	12 01 S			5½
	5 59 M 8 29 M 1 29 S				
1360		5 02 S			9½
	5 59 TU 8 29 TU 1 29 S				
		5 01 S			9½
32 Hrs	5 59 W 8 29 W 1 29 S				
	3 00 S	3 00 S	32 hrs	7½	
1510	6 00 TH 8 30 TH 1 29 S	5 01 S		2	9½
11½ Hrs		5 00 S	11½	9½	9½
K.31	6 00 M	7 00 F		1	
E.53	7 00 F 8 29 F	10 00 F		2½	
1820	10 00 F 1 30 M	4 00 M		5	
1469	4 00 M	5 00 M		1	9½
		TOTAL FOR WEEK			53

Job No.	Brought Forward	This Week	Jobs Finished	Carried Forward
1360	16	32	48	
1469				1

THE GLEDHILL-BROOK TIME RECORDERS LIMITED.

26, VICTORIA STREET, LONDON, S.W.1. Tel. Vict. 1310.

44, HILL STREET, BIRMINGHAM. Tel. Midland 2086.

EMPIRE WORKS, HUDDERSFIELD. Tel. 1069.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

CONTRACTORS TO THE ADMIRALTY AND AIR COUNCIL.

SHORT BROTHERS,

Aeroplane and Seaplane Works,

ROCHESTER, KENT,

AND

Aircraft Works & Flying Grounds,

BEDFORD.

Telephones:—
627 CHATHAM
261 AND 262 BEDFORD.
788 BATTERSEA.

Telegraphic Addresses:
"SEAPLANES," ROCHESTER.
"SHORTS," BEDFORD.
"BALLOONING," LONDON.

London Office: WHITEHALL HOUSE, 29/30, CHARING CROSS, S.W. 1.
Telephone: 373 REGENT. *Telegrams*: "TESTED, PHONE, LONDON."

EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

PUBLISHING CO., LTD., by BONNER & CO., The Chancery Lane Press, Rolls Passage

THE AEROPLANE

Edited by C. Grey

WEDNESDAY, MAY 15, 1918.

Vol. XIV. No. 20. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

John Dawson and Co. (NEWCASTLE-ON-TYNE), Ltd.

Newcastle-on-Tyne.
TELEPHONE ... ... CENTRAL NEWCASTLE 2604
TELEGRAMS ... ... "DEPENDABLE, NEWCASTLE."

Southampton House, High Holborn, W.C.1.
TELEPHONE ... ... HOLBORN 1876.

Auster LONDON for Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE NON-POISONOUS DOPE
SEE ADVERT. INSIDE.

TELEPHONE:- OLDBURY 111.
ACCLES & POLLOCK, LIMITED.
TELEGRAMS:- ACCLES OLDBURY
WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.
SEE ADVERT. INSIDE.

For GOGGLES WINDSCREENS, OBSERVATION PANELS, Etc.
TRIPLEX SAFETY GLASS
The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings**, both **Sand** and **Die**, are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons**, thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

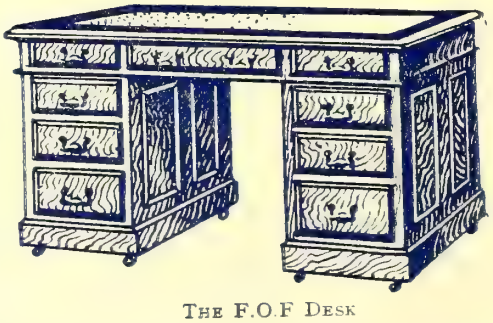
BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street, BIRMINGHAM.

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK

SAFES.

COOKE'S (FINSBURY) LTD.

FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

Telephones { LONDON WALL { 6179 573

See Telephone Book relating to our Shopfitting, Signs and other Departments

Brown Brothers LTD.



A.G.S. 162.
Spring Washers.
All sizes stocked

A.G.S. 1168 1169
Fork Ends
20,000 pairs in Stock.



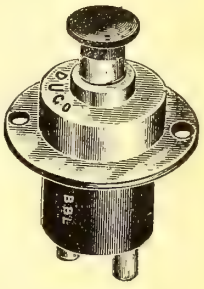
S.S. 206.
"Avro" Ball Joints.
Deliveries from Stock.



Engineer's Overalls.
With Bib, detachable elastic brace, two front patch pockets, one patch and one patch rule, double stitched throughout.
No. C50/4. Blue and Brown.

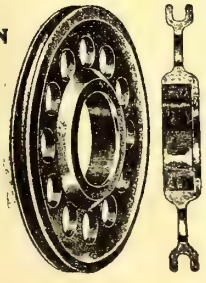
Cleaning Sleeves.
Made in strong blue dungaree or brown denim.
No. C50/9 Blue and Brown.
Our Dungaree Overalls are of the finest quality. They are made of specially strong material that will stand hard wear

The "DUCO" Joystick or Control Lever Switch
Press pattern. Instantaneous. 4 contact action. Impervious to vibration. Deliveries immediately to suit all types of machines.

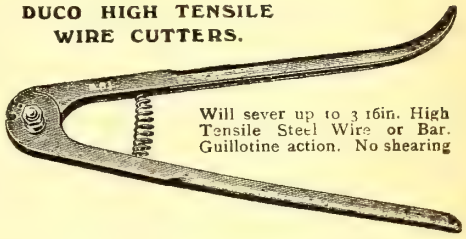


● Large contracts at special prices.

DURA UMIN PULLEY
D.W.G. 5829/46.
Deliveries from Stock.



DUCO HIGH TENSILE WIRE CUTTERS.



Will sever up to 3 16in. High Tensile Steel Wire or Bar. Guillotine action. No shearing

Head Offices
Great Eastern Street, London, E.C.2.
Telegrams—"Imbrowned, Bethroad, London." Telephones—6300 London Wall (Extension 41a).
Depots at Manchester, Paris, Melbourne, etc.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.
60-66, ROCHESTER ROW, LONDON, S.W.1.
Telephone: Vic. 7570 (3 lines).
Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

ADAM, GRIMALDI & Co., LTD.

GOVERNMENT CONTROLLED ESTAB ISHMENT

UNDER THE MUNITIONS OF WAR ACT.

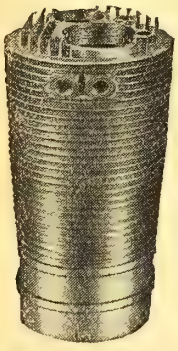
AIRCRAFT MANUFACTURERS

- CONTRACTORS TO H.M. GOVERNMENT -

ALBERT EMBANKMENT, VAUXHALL, S.E.11

Telegrams: "Autocoach, 'Phone, London."

Telephone: Hop 5552 (3 lines).



THE

Beverley Engineering Works

Aeroplane Cylinders

Clerget Le Rhône Gnôme



WILLOW AVENUE, BARNES, LONDON. 'Phone: Putney 175

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co. Ltd.

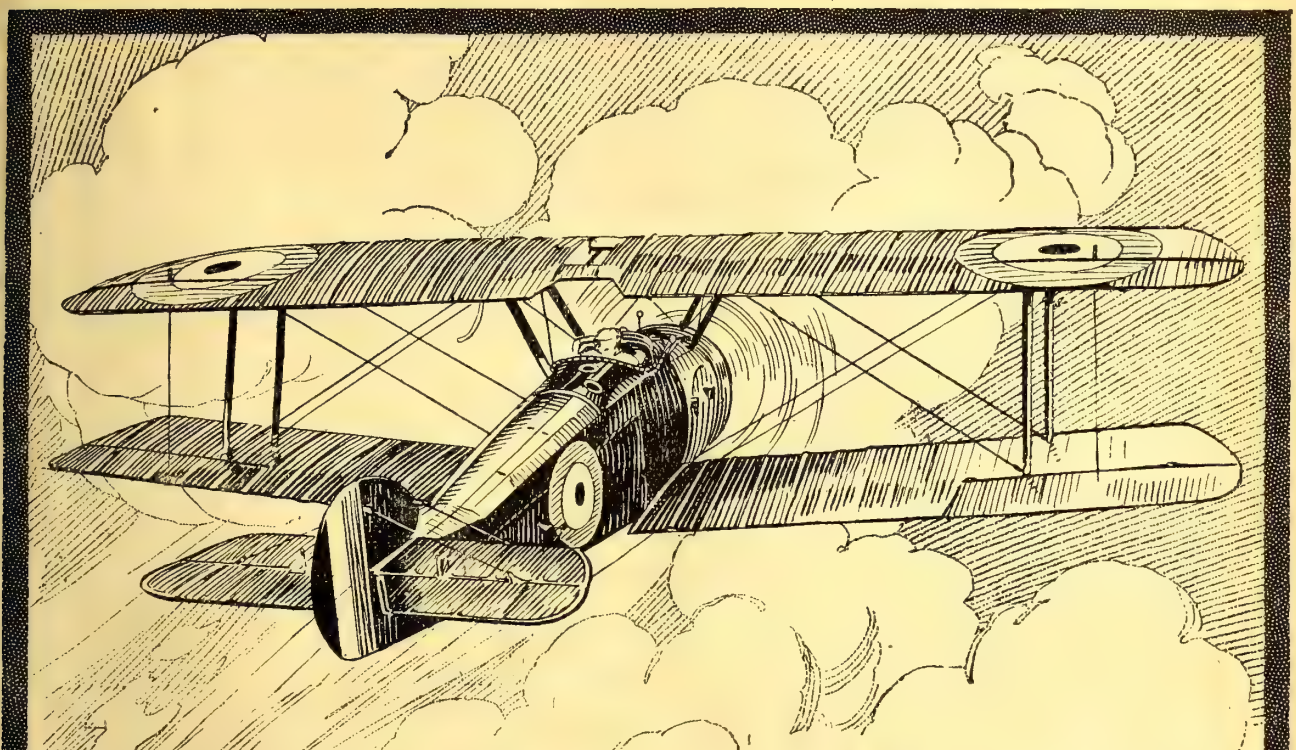
CONTRACTORS TO H.M. GOVERNMENT.

Designers and Manufacturers of all Types of Aircraft for Overland and Oversea Purposes, Flying Boa'ts, etc.

Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

229-231, Hammersmith Road, W.
King Street, Hammersmith.
Ravenscourt Park, W.



BOULTON & PAUL LTD NORWICH
SOIT MAT
DIEU ET MON DROIT
By Appointment

IN the production of Aircraft in the Boulton & Paul works we have two ideals—to furnish our customers with goods of the finest class and our workers with the healthiest and happiest way of making their livelihood. At present we are not in a position to consider any offer of further contracts. After the war our resources will be at the disposal of Great Britain and her Allies.

BOULTON & PAUL, LTD.
Makers of Aircraft NORWICH
Founded 1797

Telegrams: Aviation Norwich.
Telephone: Norwich 851

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.


WHITEHEAD
AIRCRAFT
GEOFFREY WATSON
RICHMOND
SURREY

Sterling

CASTINGS

"STERLING" Castings are made from metals scientifically prepared for the work for which they are intended. Each day's cast is carefully analysed and any deviation corrected. "Sterling" methods of moulding, coring up, and of gauging moulds and finished castings ensure a high average of accuracy.

Aluminium Crank Cases, Cylinders, Pistons;
Iron Cylinders, Pistons, Cylinder Liners;
Bronze, Phosphor, 42 Ton Manganese.

Sterling Metals, Ltd:
WIRE: "STERMET COVENTRY" PHONE: COVENTRY 881
Coventry.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.


We can deliver
A·G·S·
Shackles
158
Sizes A,B & C
in any
QUANTITIES
AT ONCE
Contractors to the Air Ministry
and their leading Constructors.
The Actual Manufacterers
The British Gold Shell
Ring Co., Ltd.,
Hounslow, Middlesex
Telegraphic Address
"GOLSHEL, HOUNSLOW"
Telephone Address
HOUNSLOW 254.

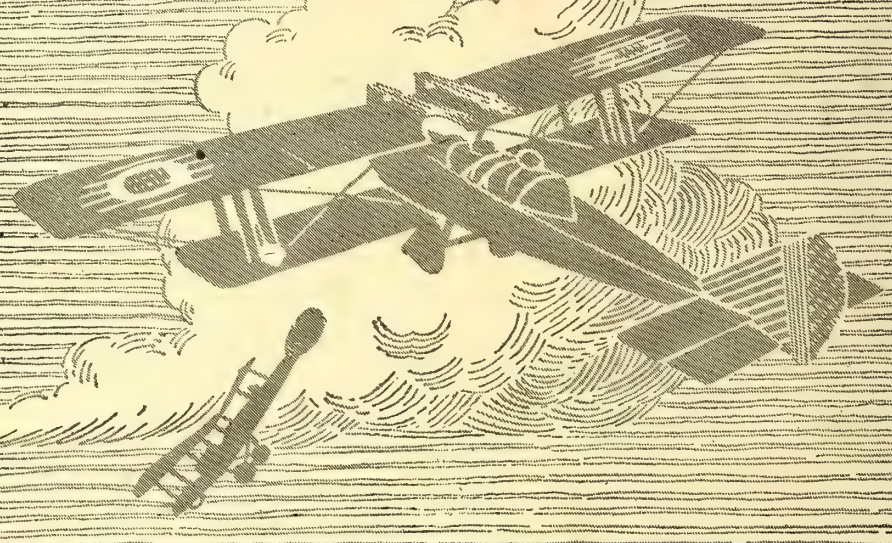
TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE-ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.

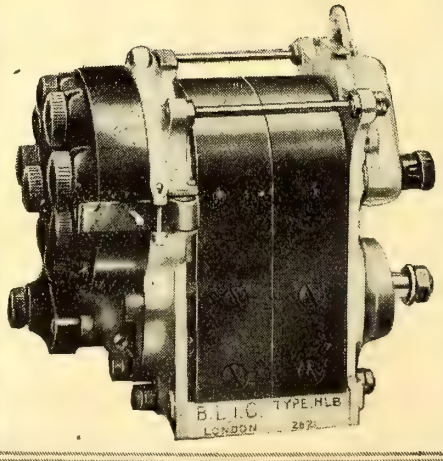
ASSOCIATION OF BRITISH MOTOR AND ALLIED MANUFACTURERS



THE HEART OF THE AEROPLANE—the vital centre of its power unit—is undoubtedly the magneto. Failure there must be unthinkable! That is why the "B.L.I.C." Magneto is supreme—its absolute reliability may be taken for granted!

B·L·I·C

THE BRITISH LIGHTING & IGNITION Co. Ltd.



THE BRITISH LIGHTING AND IGNITION Co., Ld.

204, Tottenham Court Road, London, W.1.
Proprietors: VICKERS Ld.

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

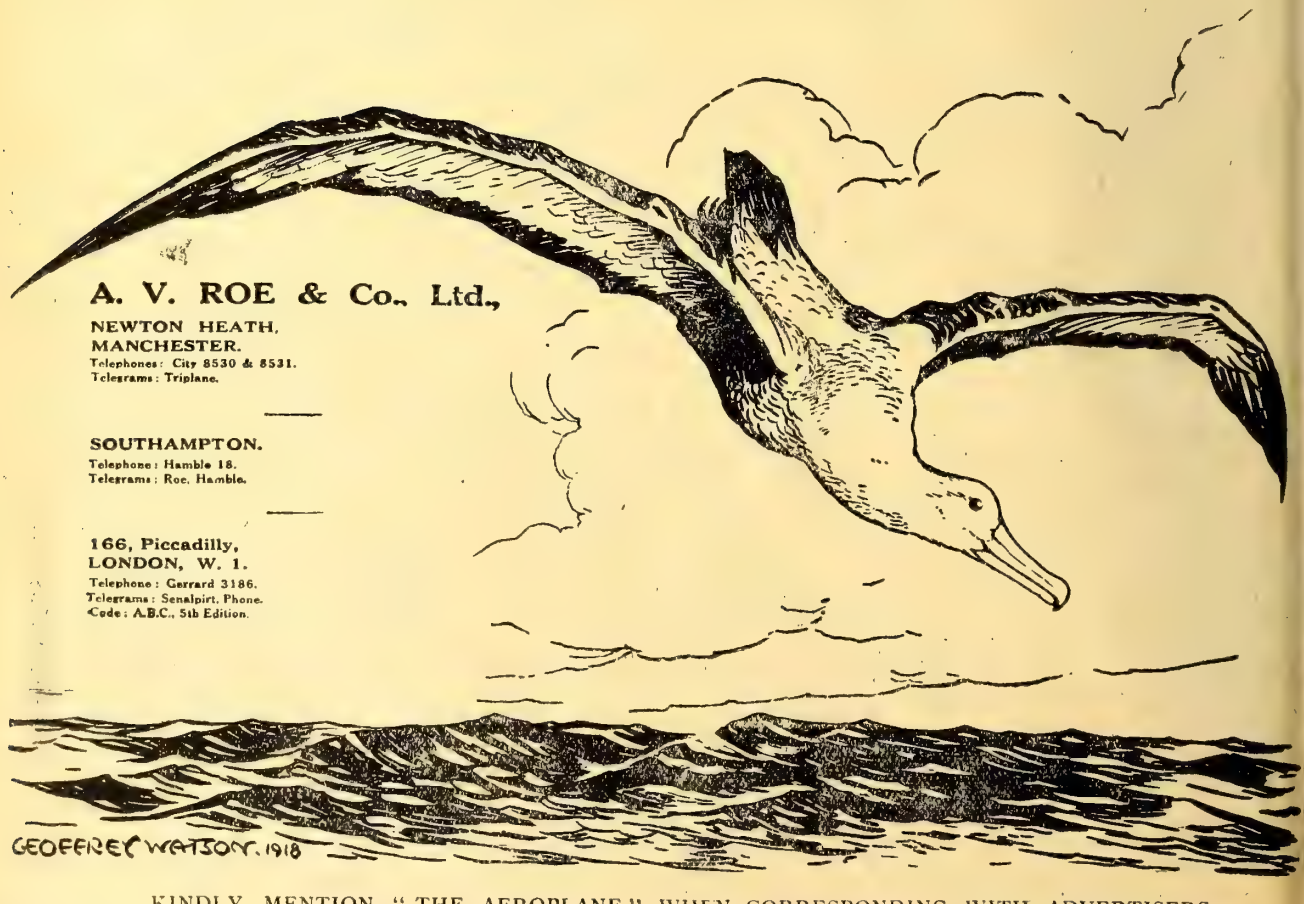
27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.



AVRO

AEROPLANES
AND
PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Senalpirt, Phone.
Code: A.B.C., 5th Edition.

GEOFFREY WATSON. 1918

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London, W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co. Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON SIR HUGH TRENCHARD'S APPOINTMENT.

On May 13th, replying to Mr. Asquith,

The Chancellor of the Exchequer (Mr. Bonar Law) id:—I am glad to say that Major-General Trenchard is been offered, and has accepted, the command of very important part of the British Air Force in ance. (Cheers.)

All those in Allied countries who desire to get on ith the war will be gratified by the official announcement that Major-General Sir Hugh Trenchard is to take mmand of R.A.F. units in France.

To say that all, or anybody, will be satisfied would ot be true, for the announcement merely says that is to command "a very important part of the British ir Force." Apart from the fact that Mr. Law might ave shown more loyalty to his King if he had used e correct title of the *Royal* Air Force, it is not satisctory that the officer who was one of the founders, id has been altogether the builder of the organisation id of the high *moral* of the Royal Flying Corps, sides being an inspiration to "a very important part" the Royal Naval Air Service which has been at one me or another under his command, should be in comand of only a portion, no matter how important, of e force which he has created. His proper position in command of more than the whole force—as has ready been suggested.

Possibly, in these topsy-turvy times, when it is olemnly announced by such a portentous nonentity as ord Curzon that more in war than in peace the soldier ould be subservient to the civilian—and the civilian olitician at that—we may be entertained by an exosition of the falsity of Euclid's axiom that the part nnot be greater than the whole. One says this without the least disrespect to Major-General Salmond, who has carried on so splendidly, as G.O.C. R.A.F. in the Field, the task which was handed over to him when his great chief came back to England to evolve order out of the potential chaos created by the politicians who mixed without amalgamating the two Flying Services.

The "Gazette" of May 11th shows that General Salmond is appointed to command a division of the R.A.F. and to retain the rank of Major-General. One assumes, therefore, that he also will command "a very important part" of the R.A.F. in France. He has commanded the whole for some five months with so much distinction that one has no anxiety about his part of what Mr. Law is pleased to call the British Air Force—presumably in order to demonstrate that, being unable to assimilate military nomenclature correctly, he, as a member of the Cabinet, is the more fitted to control the British Army.

One would have full confidence if General Salmond were to command both the part which he is to command and General Trenchard's part also, even if each part were greater than the present whole. And if General Trenchard were to command the Allied Air Forces, as Generalissimo, the confidence of all concerned for our mastery in the air would be greatly increased.

However, possibly such a happy state of affairs may come when this unhappy country acquires a Government worthy of its tenacity of purpose, instead of one which merely fits its lack of intelligence. Meantime, General Salmond's loyalty and attachment to his great chief is so well known that the Royal Air Force believes that as colleagues they will work together in perfect amity. And so we may all be confident that the King's servants on active service in the air will be able to get on with the war under the best possible leaders.

C. G. G.

THE SUPERVISION OF AIRCRAFT PRODUCTION.

The Minister of Munitions has appointed Sir Arthur uckham, K.C.B., to superintend, as Member of Munions Council, the duties of aircraft production in ıccession to Sir William Weir.

The appointment of Sir Arthur Duckham to supervise the production of aircraft in place of Sir William Veir, promoted to be Air Minister, will be eminently ıtisfactory to all who are connected with the output of ircraft. His record at the Ministry of Munitions is xtremely good, and one knows personally something f his keenness in economising material, speeding up roduction, and promoting efficiency.

Arthur McDougal Duckham was born at Blackheath n July 8th, 1879, the son of Mr. Fred E. Duckham, I.C.E. Despite his English birth and surname, one ssumes that he was not given the name of McDougal ithout just cause. Being the son of an engineer and f Scottish ancestry, Sir Arthur would appear to be of ıe right composition for his present job.

He served his time in engineering workshops under Sir George Livesay, M.I.C.E., and thereafter specialised on furnace work, with particular reference to the carbonisation of coal, and to engineering problems concerned with chemical developments. He has devised and patented a number of operations and methods in these and kindred subjects, and has travelled much abroad in connection with engineering work.

He is the senior partner in the firm of Duckham and Cloudesley, Ltd., the famous consulting gas engineers. He went to the Ministry of Munitions when the department was first organised, and is now chairman of the Advisory Committee of that Ministry. One assumes that he will continue to hold that position while employed in connection with aircraft.

Sir Arthur Duckham is married to Maud, daughter of Mr. A. D. Peppercorn, and has a son and two daughters. He is a member of the Reform Club and of the Bath Club.

In 1917 he was made a K.C.B. for his valuable work in producing munitions of war.

A MATTER NEEDING OFFICIAL INQUIRY.

The following paragraphs from the "Daily Mail" of May 10th are worthy of the special attention of the Naval, Military, and Air Force authorities :—

> A naval airman who has earned distinction during the war was invited to a house in the West End where, during five visits, he lost over £400 at chemin de fer. He lost £200 in one night.
>
> He states that the croupier was an official employed in a department of the Admiralty. This fact, and others, the airman has communicated to the Admiralty and the police.
>
> The official referred to said to a representative of the "Daily Mail" yesterday: "I have acted as croupier at a friend's house, but I have not been there for some time. I acted in purely a friendly way. I was not paid. But why ask? It does not matter to the Admiralty whether I play cards after office hours. I am fond of a game of cards and am considered a very good bridge player. I have played at Monte Carlo and have won money and also lost.
>
> "I suppose the man who made the complaint lost and he is now squealing. The house is not a gambling house; only Mr. ——'s friends go there. The games are properly conducted. I have not heard about the complaint from the Admiralty and do not expect to. They probably threw the letter into the fire. The —— (mentioning a high official) was with me to-day and he was most charming, so that does not look as if there was anything amiss, does it?"

This gives only a hint of a scandalous state of affairs well known to all who are closely in touch with the Services, and one hopes that the whole subject will be adequately handled.

It appears to be a fact that officers in Town on leave or permanently working in London are lured to the haunts of professional gamblers by affable-seeming friends or acquaintances, and are there thoroughly rooked, and frequently blackmailed afterwards. In one instance, within the writer's knowledge, a person bearing a famous fighting man's name, and holding the King's Commission, has introduced such a professional gambler to a well-known club much frequented by Service people, and has induced members therefrom to visit his friend's—perhaps his partner's—gambling house, where they have been relieved of some hundreds of pounds.

A further development of the scheme appears to be a result of forbidding officers to wear uniform when dancing in public. This order has naturally prevented them from going to ordinary night clubs, where they would be under proper supervision. Consequently "galleries" or "rooms" are booked by a group of officers—one or more of whom may be touts for purveyors of vice—and others are "invited to a party" there along with their best girls, or any other girl for that matter.

At these "parties" youngsters on leave or freshly joined meet the most charming of women and men charming because their living depends on their charm and after having danced and fed and wined they are lured off to gaming houses or other places of amusement, where they are robbed of their money.

If they are of higher social or military value they may be led further on, and ultimately fall into the grip of the blackmailer and become merely the tools of German spies or actual instruments of the Hidden Hand which has done so much to prevent us from getting on with the war.

If the Government, and the high Naval and Military authorities, are really in earnest, it is high time that drastic steps were taken to stamp out concealed vice which merely leads to blackmailing by enemy agents.

Places for public dancing and moderate gaming in public should be placed on a respectable level under official control and sanction, whether the Nonconformist Conscience objects or not.

These disclosures go still further to show that our hypocritical English love of outward respectability, no matter what inward vice it may cover, which is conveniently known as the Nonconformist Conscience, is in fact one of the strongest possible factors in keeping under the heel of the Hun those who should be getting on with the war, and in providing a constant supply of fresh recruits for the army of slaves who are dominated by German agents.—C. G. G.

THE FLYING SERVICES FUND.

The attention of charitable minded readers of The Aeroplane is hereby drawn to The Flying Services Fund, which was founded in 1915 by the Royal Aero Club.

The Honorary Treasurer is The Right Hon. Lord Kinnaird. The Committee consists of Brig.-Gen. W. W. Warner, R.A.F. (Chairman); Mr. Chester Fox; Lt.-Col. Harcourt G. Gold, R.A.F.; Maj. T. O'B. Hubbard, M.C., R.A.F.; Sqdn.-Comdr. C. E. Maude, R.N. The Secretary is Lt.-Comdr. H. E. Perrin, R.N.V.R. The Bankers are Barclay's Bank, Ltd., 4, Pall Mall East, London, S.W.1.

The objects of the Fund are approved by the Lords Commissioners of the Admiralty and the Army Council and the Royal Aero Club has instituted and is administering this Fund for the benefit of Officers, Non-Commissioned Officers and Men of the Royal Air Forces who are incapacitated on active service, and for the widows and dependents of those who are killed.

A Meeting of the Flying Services Fund Committee was held on Thursday, April 25th, 1918, when there were present:—Brig.-Gen. W. W. Warner, R.A.F., in the Chair, Mr. Chester Fox, Lt.-Col. Harcourt G. Gold, R.A.F., and Lt.-Comdr. H. E. Perrin, R.N.V.R., Secretary.

The following Grants and Allowances were made:—

(58) An allowance of £4 a month for three months to the widow of an Air Mechanic in the R.N.A.S. who had died from injuries caused through an accident while on duty.

(35) An allowance of £4 a month for six months to the father of a First Class Air Mechanic in the R.F.C. who was killed on active service.

(53) An allowance of £4 a month for twelve months to the mother of a Leading Mechanic in the R.N.A.S. who was accidentally killed on active service.

(30) An allowance of £4 a month for three months to a Second Class Air Mechanic in the R.F.C. who had been incapacitated on active service.

(39) An allowance of £5 a month for six months to a Chief Petty Officer in the R.N.A.S. who had been incapacitated on active service.

(51) An allowance of £2 a month for twelve months to the widow of a Sergeant in the R.F.C. who had died from injuries received on active service.

(33) An allowance of £2 a month for twelve months to the widow of a Second Class Air Mechanic in the R.F.C. who was killed on active service.

(47) An allowance of £4 a month for six months to the widow of a Corporal in the R.F.C. who had died from injuries received in an aeroplane accident.

(36) An allowance of £5 a month for twelve months to the widow of a Leading Mechanic in the R.N.A.S. who was killed on active service.

(61) A Grant of £5 to the mother of a Sec. Lieutenant who was killed on active service.

(63) An allowance of £2 a month for twelve months to the widow of a First Class Air Mechanic in the R.F.C. who had died from wounds received on active service.

The offices of the Fund are at The Royal Aero Club, 3, Clifford Street, London, W.1, and all contributions should be sent there.

AN EXPLANATION.

The Editor thanks "de V." for his note on guns, and much appreciates his remarks. The reason for the occasional appearance of purely political articles in The Aeroplane is simply that practically every paper in the kingdom is under the thumb of one or other of the political parties, and consequently it is only non-political papers that can speak the truth about politicians. So many tens of thousands of officers and men in the Services read The Aeroplane that it seems well in the best interests of the country that that number of the King's servants should at any rate be told a part of the truth from time to time, so that they can spread it among their less well-informed comrades. Unfortunately the law of libel and the Defence of the Realm Act combined prevent even The Aeroplane from telling the whole truth about the politicians who have at times come so near to losing the war and ruining the country.

THE NEWER CHIVALRY.

BY HENRY FORESTER.

Prehistoric War.

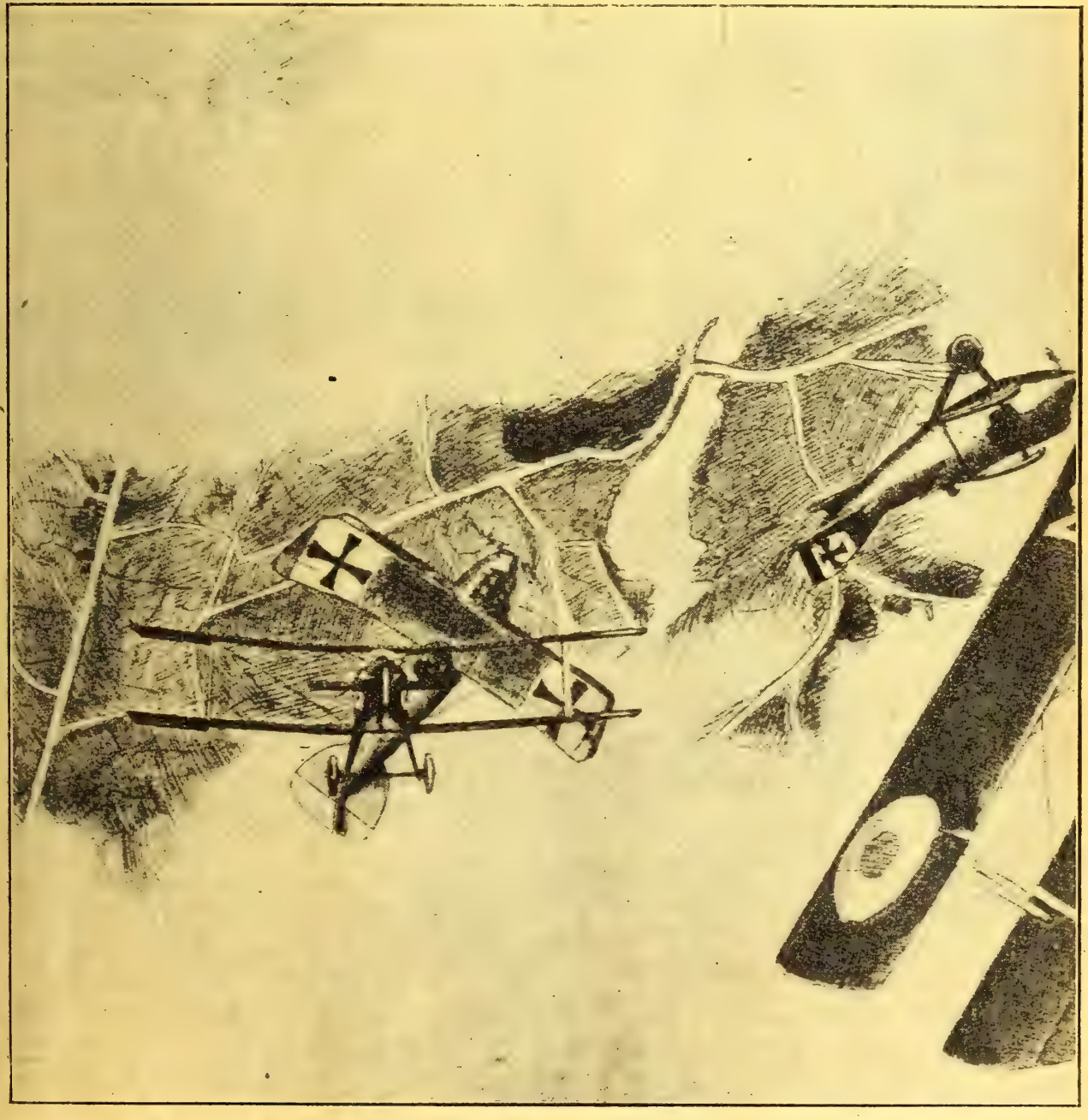
Each successive period in the history of the world has its own method of warfare, dependent for its form on the conditions of the time. In the earliest days of human existence such hostilities as were waged on various parts of the earth were personal and not communal in character. In the Stone Age the preservation of the integrity of a home and the hoarding of food for the days when scarcity would fall on the land were questions of greater import to the individual than was the higher ideal of such things as might lead to the common good. Unity of action had little attraction. The strong took all those things which they desired, and the weak learnt that evasion was a cardinal principle if continued life was desired.

Fighting in these early days was a series of hand-to-hand combats, in which flint axes, wooden clubs, and stone-tipped spears were the common weapons. Hence it fell that the weak were denied the mechanical aid which would have compensated them for their lack of strength.

As time passed the weak wearied of perpetual defeat and subjugation and developed that intellect with which the gods have chosen to reward many of those whose physical strength is insufficient to protect them against the strong. Unity of action began by degrees to take the place of individual efforts. Tribes became States, and States bred rulers whose instincts led them towards domination over neighbouring States of less efficiency.

The Coming of Great Leaders.

Alexander in his majesty, with disciplined troops organised for campaigns beyond the borders of their own land, swept through the East in an ever-increasing wave



IN A DOG FIGHT.—A Sketch by an active-service pilot of one of those mixed-up scraps commonly known as a "dog-fight." One sees the two nearest British machines diving onto two Albatroses, which are directly over an opening in the clouds. The sketch is reproduced from "Cinquante-Quatre," a little book of R.F.C. songs and illustrations, compiled by officers of an R.F.C. Squadron as a memento of their service together.

of victory. Cæsar, dissatisfied with the parochial politics of his native home, dominated in a later age the regions of the West. His legions, trained and eager, upheld the eagles in the wilds of Africa, in the Near East, in all that country which is Germany, and throughout Britain. The power of organised armies and the subjection of the individual to the common need enabled him to consolidate his victories into a great empire which endured for centuries.

Other leaders, not perhaps possessed of the same skill in statesmanship and in war, yet great in one or the other, came and went. The principles of unity in action remained, but the subordination of the individual to the commonwealth ceased in a large degree. When William the Norman conquered England, he did it not by means of a skilled standing army, but with the aid of feudal nobles and their retainers. Thus there came into England a military aristocracy for the first time.

In the following centuries throughout the period commonly known as the Dark Ages, the rules of an arbitrary chivalry were formulated, in which the man-at-arms formed that part of the army which gave solidity to the mass, whilst the knights and their attendants carried out the more brilliant operations of war. In such reconnaissance as was undertaken, in the shock action of heavy cavalry, and in the inspiring of the warlike spirit, the knights of the days of chivalry excelled.

The Knightly Principle.

The knightly rank was attainable by all who displayed singular courage and a knowledge of that seemly code which regulated every act of the perfect knight. Each, whether gentle or humble, must have served faithfully for an allotted period one who in his turn had earned the golden spurs of chivalry. The necessity of obedience was ever before the novice's eyes that he in the fulness of time might be qualified to lead men. To fight faithfully for his lord or his king, without rancour towards his enemy, was the precept which regulated each hour of his daily life.

He had to learn with earnest endeavour the use of lance and sword. The perfect combination of eye, horse, and weapon was not acquired in a day. In the hardly fought tourney between knights of equal skill the merest hairbreadth of misjudgment would make the difference victory or defeat. There were many methods of attack, from the lance under the visor—a stroke of great skill—or between the tasset and the corslet, to the mace swung with precision at the moment when the opponent has overshot his mark. Each weapon had its due manner of employment, to be learnt only with arduous devotion.

The Worthy Opponent.

When, after due preparation and proof, he was adjudged fit to enter the knightly ranks, he sought a willing foe that his new dignity might make a worthy entry into the records of chivalry. His page, like him in days but just dead, a pupil in the school of knighthood, would convey his challenge to any whose bearing in battle had singled him out for attention. And then with due observance of the laws of chivalry his fortunes would undergo the test of experience.

In battle his place was in the thickest of the fight and against the most gallant enemy who would deign to cross swords with him. His bravery and skill were designed to be an encouragement to the men-at-arms who formed the least mobile part of the army. His object in life was to make his name worthy of reverence in the camp and of legendary fame in history. No newssheets cheapened his exploits day by day, nor contrasted the numbers he had killed against the numbers killed by another not so blessed by fortune. His credit rested on the sure foundation of the respect borne him by the soldiers with whom he fought.

The Passing of the Knight.

To-day, centuries after that early form of knightly combat has passed with many pleasant things into the realms of historic memory, the names of the greatest of those who fought reverberate still in the minds of soldiers. The Chevalier Bayard *"Sans peur et sans reproche,"* the Balafré, Sir John Knollys, the Black Prince, Sir Philip Sidney, each in their day lived in such manner that their fame will never die.

But his day passed. Individual combat again gave way to unity of effort. The improved tactical employment of troops left no place for the knight with his peculiar code and manner of war. Concerted movements of bodies of cavalry were an effective substitute for the isolated bravery of the knightly horseman. New weapons, the cannon, the musket, and pistol, left him little place in war save as the orderly but gallant leader of disciplined men.

The knights of the Middle Ages could not alone bring victory to the kings they served. Success in battle then as now fell to the trained and loyal forces strong in infantry and fired with a firm belief in the righteousness of their cause. They were, nevertheless, an integral part of that army, and were the inspiration that led it to victory. They did not live in vain.

The Great Revival.

To-day there is a revival of that manner of war. Personal combat has returned for a space. Duels are fought in the presence of opposing armies as brilliantly and as grimly as ever in the days of old. Personal gallantry and personal skill has in one branch of war again taken the place of concerted action. The conditions of war have changed, while the principles remain the same, yet early methods have revived for a while.

The aeroplane pilot of to-day, who flies in fighting machines, is no unworthy successor of the knight of old. Flying in an element where control from the Higher Command is difficult to enforce, under conditions in which swiftness of decision and determined courage are essential to success, the pilot, if he so wills it, can revive all that is best of the olden days. His preparation for war is not, or should not be, very dissimilar.

The Science of Combat.

There is an exact science of aerial fighting, a series of proper methods to be adopted in the destruction of an enemy. On broad lines each may develop his method of attack, as has each of those who have become famous as fighters in the air.

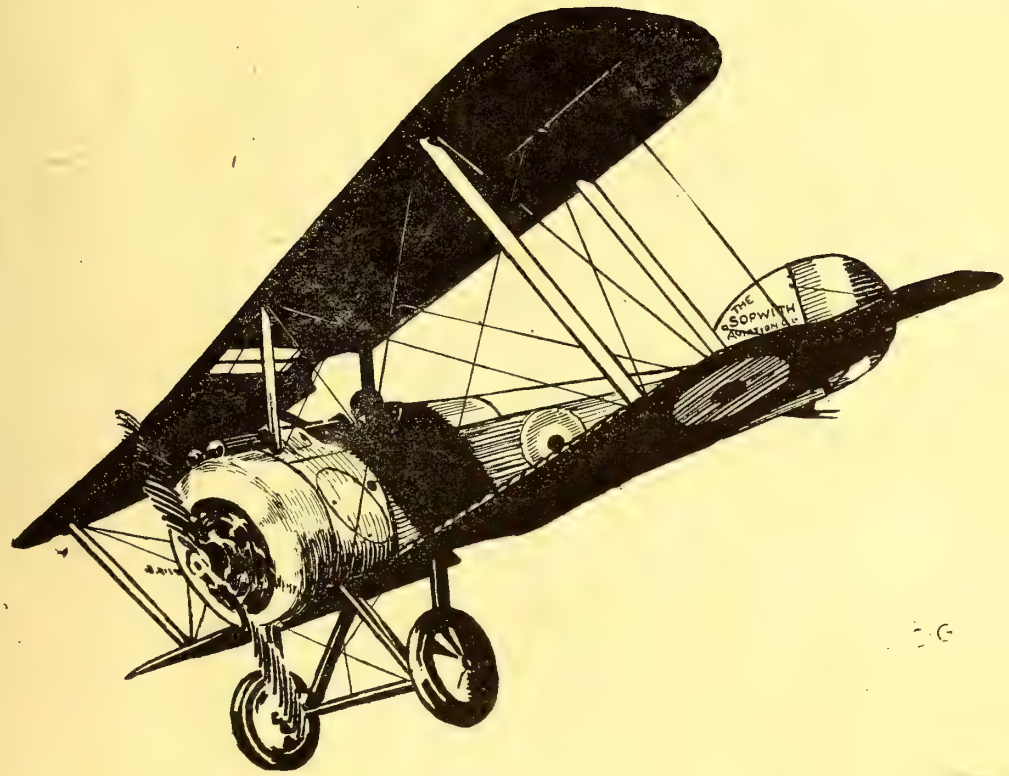
Given weapons of equal precision and aeroplanes of equal excellence, success will lie with the fighter of greater skill. Herein lies much of the fascination of fighting in the air. The better man wins, and that is as the gods would have it.

The Old Challenge.

In the earlier stages of the present war legend has it that challenges to mortal combat passed between British and German pilots from time to time. Immelmann, who has gone honoured to a soldier's grave, is said on occasion to have invited pilots to meet him at a stated hour above the Foret d'Houthulst, and one understands that his challenges were accepted. The duel was fought for good or ill while no other aeroplanes interfered, for it would be beyond the rules of this quaint later chivalry to interfere in a personal battle of such a nature. This is the story; whether it be true, one leaves to others to judge. There is little doubt that many of our own people in less strenuous times than these present days have themselves issued such invitations to mortal combat.

There is a further parallel to the days of chivalry in aerial warfare. Pilots are not wont to speak bitterly or cheaply of dead enemies of whatever race they may

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

Paris Office:
21, RUE DU MONT THABOR.

be. The deaths of the great pilots Immelmann, Hawker, Bölcke, Ball, and so through the gallant list, have been mourned by the best in both armies. Gallantry is a sure answer to rancour and ill-feeling. The brave man has no race.

Not very long ago a British pilot, since gone gallantly to death, received the D.S.O. His brother-officers celebrated the occasion in the usual manner. When called upon for a speech, the hero of the evening proposed the health of—von Richthofen. The toast was honoured by the whole squadron, with one dissentient.

An aerial battle of to-day, even if both of the opposing forces fly in formation, break up rapidly into a series of personal combats if pilots of equal gallantry are fortunate enough to meet. The dead knights of yesterday will feel a kindred spirit with these newer knights who have gone to-day.

The Deadly Advertisement.

There is a deadly habit arising in the country. Advertisement, proper in the markets, is spreading into war. The "Daily Mail," intent on its daily discovery of the things that were known before, clamours insistently for the names of those who have behaved gallantly in the air, and whose gallantry has been acknowledged. The name, once known, is blazoned forth to the world with additional descriptions of the deeds of valour that have earned this unpleasant reward. Others, more fortunate, remain unknown to the "Daily Mail," but sadly enough are regarded with less faith by the public because they, too, have not been advertised.

The principle is wrong. Bravery and high efficiency will gain for a man great credit among his fellows, and his exploits will be spoken of until they are almost legendary. This military fame is truer and of higher value than all that can be said in the news-sheets. An army soon learns of its gallant men. None is more ready to acknowledge than those who are also brave.

The Repetition of History.

The day of knight-errantry in the air is passing. Organised tactics are taking the place of individual actions. Future aerial operations will be carried out in formations moving into action with manœuvres not less elaborate than those common on the ground. Individual skill will be of less importance than the efficiency of the mass. The pilot whose marksmanship, no less than his power of manœuvre, gained many victories in the air will find that the fire of many, not all of whom will be highly skilled, is proportionately more deadly in its effect. Later, too, a strategy of the air will develop, but not until the duration of continuous flight has been greatly increased.

The fighting pilot of to-day is fortunate in the freedom of action which is necessary for his effective employment. He is still more fortunate in that his exploits are carried out in such manner as gives him celebrity amongst his fellows. He is creating a tradition and forming legends that will live while the English race exists. Some of those who have gone will leave a name in history not less glorious than did Bayard or Philip Sidney.

THE R.F.C. FAMILIES' RELIEF FUND.

The following is a list of the Committee of the Royal Flying Corps Families' Relief Fund:—

Major-General H. T. Arbuthnot, C.B., Chairman and Hon. Treasurer, Ramsay House, Shooter's Hill, S.E.18

The Hon. Lady Shelley-Rolls, 21, Eaton Square, S.W.

Lady Henderson, Orchardmains, Tonbridge.

Lady Leighton, 6, Wellington Court, Knightsbridge, S.W.

Mrs. Barrington-Kennett, Remenham, Wraysbury, Bucks.

Miss Cholmondeley, Sedgewell House, Ideford, South Devon.

Mr. R. M. Balston, 41, Roland Gardens, S.W.7.

Lieut. E. Clive Fowler, R.F.C., Representing the War Office.

Mr. A. H. Varnier, Hon. Secretary, 46, Dover Street, W.1.

In August, 1914, the Chairman of the Aerial League (Major-General H. T. Arbuthnot, C.B.) wrote to Lieut.-General Sir David Henderson, K.C.B., D.S.O., to ask if the League could be of any assistance to him in the war; in reply Sir David Henderson said that he would feel greatly obliged if the League would look after the women and children of the men of the Royal Flying Corps; in accordance with that request this Fund was established to assist the widows and other dependants (who may be in necessitous circumstances) of N.C.Os. and Men of the R.F.C. who lose their lives on active service.

This Fund was registered under the War Charities Act, 1916.

A letter was inserted in various newspapers inviting contributions, which met with a liberal response; the Fund was also assisted by amounts collected by various ladies and gentlemen.

The circumstances of the families of 573 (five hundred and seventy-three) aviators who have lost their lives on active service have been investigated (with the co-operation of the representatives throughout the United Kingdom of the Soldiers' and Sailors' Families' Association and of the War Pensions Committees); of this number 134 (one hundred and thirty-four) families have been assisted financially.

Many letters have been received expressing gratitude for the help rendered at a most difficult time.

Official reports of casualties are supplied regularly by the Officer-in-Charge of Records of the R.F.C.

In consequence of the greatly extended operations of the war at the various fronts, a far larger number of casualties are now reported than at any previous time; the Committee fear that this must increase as the war goes on.

As the Fund is getting low, the Committee have decided to make a fresh appeal for contributions so that no really necessitous case shall remain without assistance, and, in view of the splendid work which our airmen are doing, they feel confident that they will not appeal in vain

HOW NOT TO ENCOURAGE RECRUITING IN THE R.A.F.

An engineer writes:—

On April 15th a young man 18½ years (Grade II.) working on carburettor fitting, applied at the R.A.F. Reception Depot (as per instructions in the Air Force Memorandum No. 6 in your issue of April 10th) to enlist as fitter in an R.A.F. mechanical unit.

He was given a letter to take to the local recruiting office. From there he was sent to the Kingston Munition Area Recruiting Office. Thence he was sent back again to Whitehall, where he was told to await final instructions and railway warrant to attend some centre for trade test.

He therefore left his job at the end of the week, and after a few days had instructions to attend at Whitehall at 9.30 a.m.

He arrived at 9.30 and waited with a number of other men in similar circumstances in an upper room until 4.30 p.m., and was then told that no more men could be accepted in any branch of the R.A.F., and that it would be no use for him to apply again for at least another month.

He was told to apply for the re-issue of his trade protection certificate at the Kingston M.A.R.O., and is now back at work.

The firm are about 14 carburettors short on their output, and he is about £9 wages short, just because he was anxious to do his bit in khaki at 2s. per day instead of remaining at his job in "civvies" at over £6 per week.

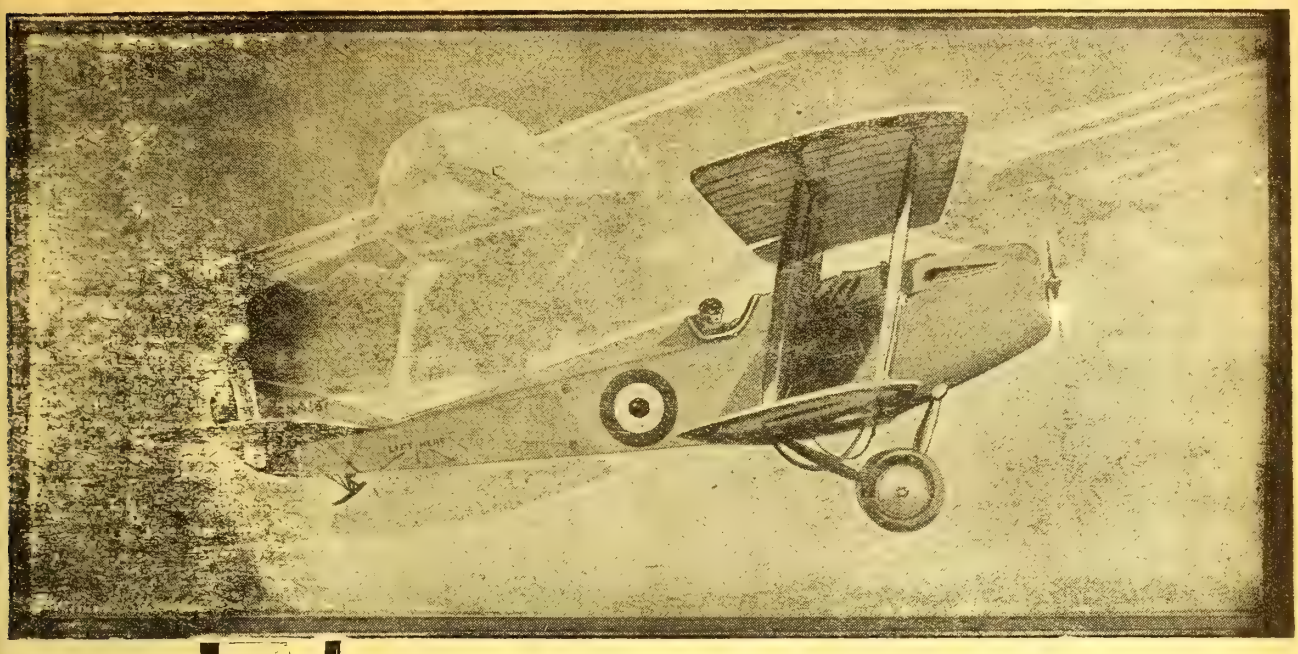
To say the least about it, this is not at all encouraging to anyone married or single to join up before being actually *combed* out.

FIRST CATCH YOUR HARE.

At a lecture on "Economic Problems of Peace after War" at University College on May 7th, Professor W. R. Scott spoke of a League of Nations, and said that if such a league was to be successful it must, in so far as it was possible, remove or diminish any friction which arose from competitive schemes of nations in regard to trade routes. These were the life-nerves of a nation, and if endangered would jeopardise its safety.

One of the first problems to be decided after the declaration of peace would be the freedom of the air. Already there were indications that postal services might be transferred from the railways to the air, and no doubt aerial passenger traffic would soon be an established fact. There might be a reluctance on the part of many nations to permit unrestricted use of the air to foreign nations. A solution of this problem, he suggested, might be found in the establishment of a freedom of the air on the same basis as the freedom of the seas before the war, under the control of an International Aerial Board.

[Why not start in and win the war first and lay down international regulations based on the terms of peace.—Ed.]

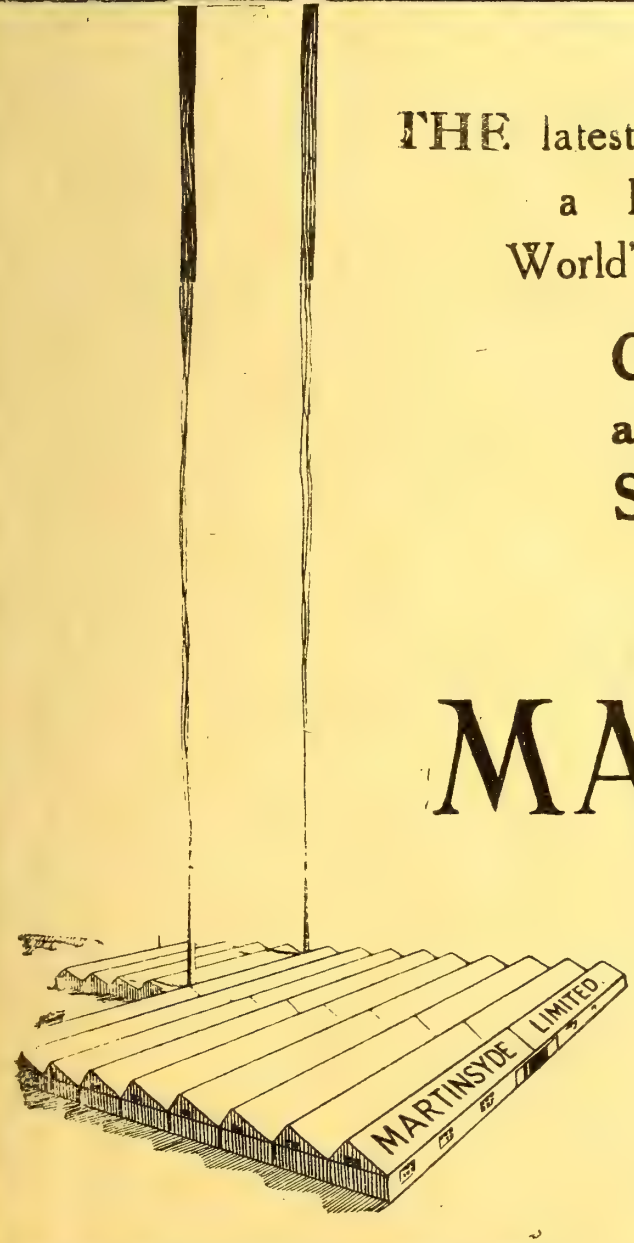


THE latest Martinsyde Fighter, fitted a Rolls-Royce Engine, holds World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE



Head Office

WOKING, Surrey.

DORA AND "THE AEROPLANE."

Readers of this paper, though perhaps not deeply interested in its private affairs, may like to have a brief account of the prosecution of Monday last. The following account, taken from the "Morning Post," is quite accurate as far as it goes, and is probably as full as any account which would be passed by the Press Bureau, seeing that the Censorship might not like to see all the facts of the case in print, especially those which demonstrate the curious way in which the Censorship on occasion conducts its own business.

As an example of breaking a butterfly upon a wheel, or of cracking an egg with a steam hammer, all the official excitement over a singularly uninformative sketch of a well-known and old-established workshop is quite in accord with our best Governmental tradition. One cannot, obviously, reproduce the alleged illustrations—which did not illustrate anything—for the entertainment of readers, but those who keep their back numbers of THE AEROPLANE can have no trouble in identifying them, seeing that the Censorship has kindly permitted the publication of the dates on which they appeared.

Mr. Travers Humphreys, for the defence, handled his case to perfection, and one desires to express one's personal gratitude to him, as well as admiration for his ability in grasping at the shortest notice technical points which might well have escaped the comprehension of more famous counsel after quite lengthy consultation.

The fine may appear large, but, stated briefly, the course of the case amounted to this. Sir Archibald Bodkin, the prosecuting counsel, said, in effect: "Here is a very excellent paper, edited by a knowledgeable person who has made a mistake." Mr. Travers Humphreys endorsed his remarks and emphasised the merits of the paper. And the Magistrate seems very naturally to have taken the view that if the paper were as good as two such distinguished gentlemen stated, it and its editor ought to be fined £50 apiece for a technical offence which, in a minor publication, would have been let off with a fiver or so.

Naturally, one pleaded guilty, for under the Defence of the Realm Act it is an offence against the regulations to exist at all. D.O.R.A. makes it an offence to collect or record information concerning munitions of war. Every engineering paper, every motor paper, and every aeronautical paper exists for and by the breaking that particular regulation. There is practically no act in the daily life of any one of us which could not be made an offence against D.O.R.A. if the Authorities desired so to interpret the regulations. For instance, leaving crumbs on one's plate at breakfast is wasting human food, and anyone so doing is liable to a fine of £50.

The maximum amount of harm which could have been done by publishing the advertisement on account of which this paper was fined was rather less than the amount done by leaving crumbs on a plate, especially when one considers that it had previously appeared in two other aeronautical papers. The fact that THE AEROPLANE was prosecuted and that they were not might perhaps be taken as a compliment, as indicating the importance attached by the Authorities to the respective circulations and relative influence of the various journals, but one imagines that the prosecution was really ordered on grounds, which may perhaps be explained after the war, when D.O.R.A. is dead.

In any case, one has no complaint to make against any of those concerned with the purely legal proceedings. One only hopes that the £115 15s. which the Government has thus acquired will help it to get on with the war.

The "Morning Post's" report reads as follows:—

Mr. Charles Grey Grey, editor of THE AEROPLANE, and THE AEROPLANE and General Publishing Company, Limited, Bream's Buildings, E.C., were summoned at Bow Street Police Court on May 13th for publishing in the issues of THE AEROPLANE of April 3rd and April 10th, without lawful authority, information with respect to the place of manufacture of aeroplanes, contrary to Regulations of the Defence of the Realm Regulations.

Mr. Travers Humphreys, for the defence, having intimated that his clients would plead guilty to the summonses relating to the issue of the paper of April 10th, Sir Archibald Bodkin, for the Director of Public Prosecutions, said he was content to accept that plea and to withdraw the summonses relating to the issue of April 3rd.

Mr. Grey was the editor of THE AEROPLANE, an important weekly paper, which dealt with all kinds of matters connected with aeroplanes and aeronautical engineering. On March 29th the Official Press Bureau sent a letter addressed to him, pointing out that although there was no objection on the part of the Authorities to the publication of the addresses of the offices of aircraft and other munition manufacturers it was not permissible, except in the case of very old-established and well-known works, to give the addresses of the actual factories or to make mention of the exact locality in which they were situated.

Accompanying the letter was a marked copy of THE AEROPLANE, indicating the kind of announcements considered undesirable by the Authorities. Nevertheless, in the issue of April 3rd there was a large advertisement which not only gave the exact address of certain works, but also an illustration of them, though the latter was imaginative to a considerable degree.

Mr. Grey, although he was not the advertisement manager, had accepted full responsibility, but explained that he had not seen the advertisement in question before it appeared, and that the sketch accompanying it was not a bit like the real works. He also mentioned that the letter from the Press Bureau, dated March 29th, did not, owing to the Easter vacation, reach him until April 2nd or 3rd and that the advertisement part of the paper had gone to press on March 27th.

Those were the facts relating to the summonses which he had now withdrawn as to the issue of April 3rd.

In the issue of April 10th there was an advertisement of a certain works with the address, including an illustration which gave a fair representation of the actual factory, and in regard to that, considering the circumstances, it could not be denied that there had been some carelessness.

Mr. Travers Humphreys said Mr. Grey had now given instructions that any new advertisements dealing with these works should be submitted to the Official Press Bureau before insertion. The advertisement complained of in the issue of April 10th related to certain works, but he was in a position if necessary to call expert evidence to show that no aviator would be able from the air, or even from the ground, to recognise the company's works from the illustration given in the paper. (Laughter.)

It was admitted that a technical offence had been committed. Mr. Grey was most anxious to fall in with the Authorities' views.

Mr. Graham Campbell (the Magistrate) said it was most important that a paper like that of the defendants should not contain any indication of the exact locality in which aeroplanes and their accessories were manufactured. Mr. Grey and the company would each be fined £50 and the company would also have to pay 15 guineas costs.

AIRCRAFT IN THE HOUSE.

On May 9th **Sir H. Norman** (R., Blackburn) asked the Prime Minister if, on April 9th, the late Secretary of State to the Air Ministry submitted a memorandum to him setting forth the changes he proposed to make in the reorganisation of the Royal Air Force in this country, with the reasons for those changes, and asking assent thereto; if this memorandum contained nothing of a secret nature except two figures; and, if so, to remove a prevalent misconception and in the interests of the Royal Air Force, would he communicate this memorandum, omitting any confidential figures, to the House, together with the reply from the War Cabinet conveying approval of the changes proposed and authority to carry them into effect.

Mr. Bonar Law: The document to which the right hon. gentleman refers is of a confidential character, and it would not be right to answer this question.

Sir H. Norman: Will the right hon. gentleman say whether he will seek some method of conveying to the House and the public, including the members of the Royal Air Force, at least the outlines of the reorganisation which is proposed, and of which the resignation of Gen. Trenchard was a part?—**Mr. Bonar Law**: The question as to general information ought to be addressed to the Air Board. As to the question on the paper, I can only repeat that the document is intended for the Cabinet, and must be regarded as for the Cabinet alone.

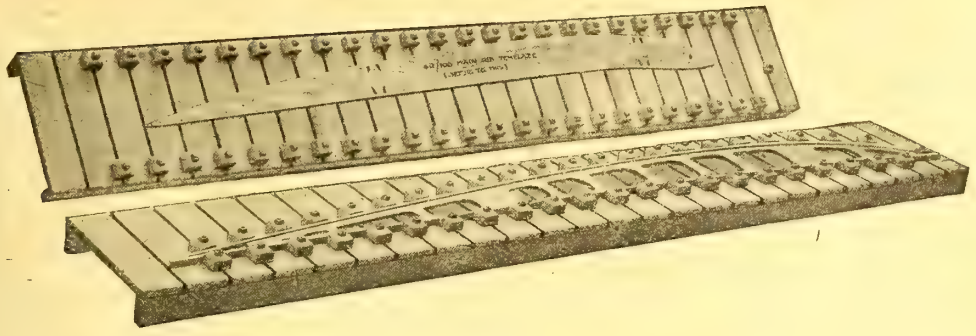
On May 13th the **Chancellor of the Exchequer,** asked by Mr. **Joynson-Hicks** whether arrangements had yet been made for the Secretary of State for the Air Forces to receive a seat either in this or the other House of Parliament, said:—I hope that an announcement will shortly be made on this subject.

THE BLOCKING OF OSTEND.

The following refers to the Ostend raid on May 9th:—

About 1.45 a.m. the enemy began firing. By the light of star shell it was observed that smoke screens were progressing excellently. A little before this, however, the sky, which had hitherto been almost unclouded, began to be partly obscured by low-drifting clouds, and at 1.50, just 10 minutes before the "Vindictive" was due to arrive at the harbour entrance, a sea fog set in. It stopped for a time the bombing attacks by the wing attached to the Dover Command, which formed part of the programme of the operation, and even searchlights could not be seen. The fog continued to drift towards the shore for nearly an hour before it cleared sufficiently for the air attacks to be resumed. It was impossible to see anything through the fog beyond 300 or 400 yards, and the "Vindictive's" task was thus rendered extremely difficult.

F.105.



To help you in accuracy and output we offer you the

BLACKBURN

PATENT ADJUSTABLE RIB JIG

There is no need to make a Jig for each type of rib. With the Blackburn Adjustable Rib Jig you can put the whole of your staff on one type of rib or, in a few minutes, turn everybody on to another type. Our Jig is strongly built and suits any rib you may require.

PRICES AND PARTICULARS ON APPLICATION.

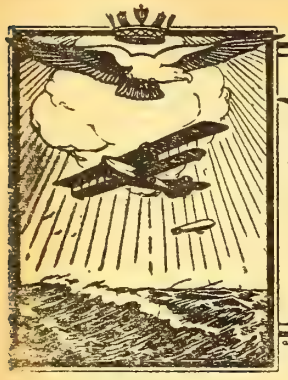
All enquiries direct to The Proprietors:

BLACKBURN AIRCRAFT PRODUCTS,
30, Norfolk Street, Strand, London, W.C.2

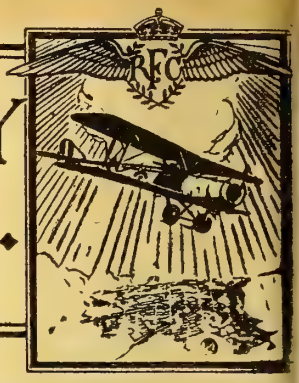
Blackburn AIRCRAFT

Steele's Ad. Serv.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

ADMIRALTY, May 7th.

Vice-Admi. C. L. Napier, C.B., has been placed on the Retired List, at his own request, from April 26th. The following promotion has accordingly been made from that date :—To be Vice-Admi. : Rear-Admi. M. E. F. Kerr, C.B., M.V.O.

WAR OFFICE, May 7th.

REGULAR FORCES.—ESTABLISHMENTS—R.F.C.—MIL. WING.—Special Appt.—Graded as Flt. Comdr.—Capt. V. H. Huston, M.C., Canadian A.S.C., a Flying Officer, March 20th.

SCHOOLS OF INSTRN.—SCHOOL OF TECHNICAL TRAINING.—Asst. Instr.—Graded as an Equipt. Officer, 2nd Cl.—Temp. Sec. Lt. A. G. Harrison, Gen. List, a Flying Officer, and to be temp. Lt. while so empld., March 5th.

AIR MINISTRY, May 7th.

R.A.F.—The following temp. appts. are made at the Air Ministry :—Staff Officers, 2nd Cl.—Lt. (temp. Capt.) P. M. Beachcroft, and to be temp. Maj. while so empld., April 1st.

Staff Officers, 3rd Cl.—And to be temp. Capts. while so empld.—Sec. Lt. W. H. Dallow, Lt. T. Jones, April 1st. The initials of Capt. W. T. S. Williams, D.S.C., are as now described, and not as in the "Gazette" of April 2nd.

The following temp. appts. are made :—Director.—Col. (temp. Brig.-Gen.) F. R. Scarlett, D.S.O., April 1st.

Staff Officers, 1st Cl.—Maj. (temp. Lt.-Col.) C. H. K. Edmonds, D.S.O., Maj. (temp. Lt.-Col.) L. H. Strain, D.S.C., April 1st.

Staff Officers, 2nd Cl.—Lt. (Hon. Capt.) R. F. Maitland, and to be temp. Maj. while so empld. ; Capt. (temp. Maj.) W. C. Michie, Capt. (temp. Maj.) R. E. Nicoll, Lt. (Hon. Capt.) H. A. J. Wilson, and to be temp. Maj. while so empld., April 1st.

Staff Officers, 3rd Cl.—Lt. (temp. Capt.) L. E. Lander, Lt. (temp. Capt.) A. M. Waistell, D.S.C., April 1st.

To be temp. Cols. :—Lt.-Col. R. Gordon, D.S.O., while comdg. a group ; Lt.-Col. A. M. Longmore, while sen. R.A.F. Officer on the staff of the Commander-in-Chief, Mediterranean, April 1st.

FLYING BRANCH.—Capt. R. S. McClintock to be temp. Maj. while empld. as Maj. (Flying), April 20th.

Lts. to be temp. Capts. while empld. as Capts. (Flying) :—B. E. Berrington, (Hon. Capt.) H. G. ffiske, C. H. Tayler, April 3rd ; J. M. Batting, J. Cullen, W. L. Fenwick, T. S. Ivens, H. M. Moody, R. K. Morris, G. R. Travis, April 10th ; S. Baker, H. A. Pearson, M.C., G. L. Stedman, April 11th ; P. S. Burge, April 20th ; J. S. Stubbs, April 21st ; (Hon. Capt.) J. F. Chisholm, (Hon. Capt.) W. F. Cleghorn, April 22nd ; (Hon. Capt.) L. W. Jarvis, G. B. Solomon, April 23rd ; M. H. Findlay, D.S.C , K. R. Napier, L. A. Payne, April 25th ; R. Affleck, R. F. Browne, E. G. Leake, M.C., April 26th ; G. G. Crutchley, P. H. Cummings, A. L. Fleming, April 27th ; R. S. Durno, April 28th ; W. Beaver, May 2nd.

The follg. are granted temp. commns. as Sec. Lts. (A. and S.) :—C. H. Askwith, H. N. V. Barnes, T. E. W. Browne, H. L. Burley, O. H. Dampier-Bennett, D. W. Davies, L. C. Hillman, J. D. Horgan, F. J. Kieran, H. S. Matthews, D. R. McLachrie, W. S. Page, F. W. Paget, S. J. Saunders, G. F. Smith, G. R. B. Smyth, J. J. Sullivan, T. W. Whittaker, April 8th ; H. D. McLaren, J. A. Robb, April 10th ; B. G. Blampied, C. H. Bridge, J. M. Clarke, S. R. Clutterbuck, April 12th ; H. H. Coulson, H. R. A. V. Puncher, April 15th ; L. D. Brown, W. N. Shuttleworth, April 17th ; J. A. E. Steel, D. G. Wassell, April 27th.

The follg. are granted temp. commns. as Sec. Lts. (Obsr. Officers) :—A. G. Bishop, H. L. Carter, E. C. Coombes, E. C. Garland, C. J. Lewis, T. F. P. Llewellyn, F. I. L. Reis, L. A. Thrower, H. B. V. Vaughan-Evans, April 25th.

The follg. are granted temp. commns. as Sec. Lts. (Kite Balloon Officers) :—J. C. Buckley, L. R. Grice, W. J. P. Woodhouse, April 5th ; G. T. Burton, S. C. Capes, R. N. Richards, D. E. Williams, April 6th ; A. W. N. Evans, G. S. Thomas, April 10th ; A. D. E. S. Ades, R. Begg, F. Chambers, J. Cranfield, W. Eccles, J. A. Kenyon, G. N. P. Oates, D. Smith, I. A. R. Stedeford, J. W. Watson, April 12th ; H. W. Diss, April 16th ; S. H. Mabbott, M. H. Steff, April 18th ; R. H. Bailey, April 19th ; C. N. Crofton-Sleigh, H. Stephenson, W. E. Titchmarsh, April 20th ; W. O. Marshall, April 22nd ; R. G. K. Baker, C. H. Coggins, R. G. A. Colley, J. Garrety, A. C. E. Smith, April 23rd ; J. S. Corrigan, H. Grellier, A. D. M. Spear, April 24th ; K. G. Macmillan, April 25th.

Capt. and Hon. Maj. (Maj. Ind. Army) H. A. Hill resigns his commn. on ceasing to be empld., May 1st.

Lt. C. A. Malcolmson resigns his commn., May 8th.

Lt. (Lt., Can. Local Forces) J. F. Proctor relinquishes his commn. on account of ill-health contracted on active service, May 8th.

Lt. D. M. Scrimgeour resigns his commn. to resume his medical studies, and is granted hon. rank of Lt., May 8th.

ADMINISTRATIVE BRANCH.—F. H. G. Playfair (Lt.-Col., T.F. Res.) is granted a temp. commn. as Lt.-Col., April 6th.

Lts. to be temp. Capts. while empld. as Admin. Capts. :—W. J. King, April 30th ; P. R. Hutchinson, L. L. W. Smythe, May 9th.

Sec. Lts. to be temp Lts. while empld. as Admin. Lts. :—H. Norrington, April 1st ; A. J. Bright, A. Miller, April 28th ; (Hon. Lt.) R. L. Hubball, April 30th ; (Hon. Lt.) L. B. Clarkson, May 4th.

The follg. are granted temp. commns. as Sec. Lts. :—W. Borland, A. C. Cunnison, R. S. Dias, B. J. M. Dumas, E. L. Henry, G. H. Keeble, C. Lewis, C. Marley, J. Mellor, J. M. Russell, A. Scott, R. O. Vasey, L. Wardley, W. G. Willis, May 1st.

The follg. Cadets are granted temp. commns. as Sec. Lts. (Administrative) :—R. M. Freshwater, P. J. O'Brien, April 12th ; A. J. Ashton, G. W. Axtell, H. V. David, C. D. Davis, P. T. Grant, J. H. Hampton, V. S. G. Hawkins, W. Riley, A. S. Underhill, April 17th ; C. Donald, H. R. Whitehead, E. G. Bugg, F. F. Schorn, D. L. Gould, C. Brooke, D. McN. Livingstone, F. D. McClinton, W. Bartley, April 23rd ; A. H. Allardyce, W. Blackhurst, W. J. Bocking, S. R. Bolton, T. Fairley, W. Knight, E. Simpson, E. T. Stead, April 29th ; F. Butler, R. Davies, G. Harrison, J. N. Holman, W. E. Jones, A. Low, F. J. W. Miles, J. L. Muir, R. P. Rodick, H. L. Shearer, G. K. Smith, F. Taylor, D. A. Watson, May 6th.

Sec. Lt. W. H. Ayre resigns his commn., May 8th.

Sec. Lt. G. R. Davies relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Sec. Lt., May 8th.

Sec. Lt. S. J. Dodson resigns his commn., May 8th.

Sec. Lt. F. E. Schultz resigns his commn., May 8th.

TECHNICAL BRANCH.—Maj. J. Mead, M.C., to be temp. Lt.-Col. while empld. as Lt.-Col. (Tech.), April 27th.

To be temp. Majs. while empld. as Maj. (Tech.) :—Lt. (temp. Capt.) O. Stewart, M.C., April 10th ; Lt. (temp. Capt.) O. Lindquist, April 18th.

Lt. A. H. Chapman to be temp. Capt. while empld. as Capt. (Tech.), April 23rd.

Sec. Lt. L. S. Seccombe to be temp. Capt. (without the pay and allowances of that rank) while specially empld., April 30th.

Lts. to be temp. Capts. while empld. as Capts. (Tech.) :—H. E. O. Ellis, M.C., W. H. Hoffert, G. McKerrow, April 1st ; E. McR. Cockell, April 20th ; P. H. M. Currie, A. Hawley, May 1st ; R. Scott, May 3rd.

Sec. Lts. to be temp. Lts. while empld. as Lts. (Tech.) :—E. Hiscock, (Hon. Lt.) R. T. Lattey, April 1st ; E. F. Cameron, April 5th ; (Hon. Lt.) A. T. Thompson, April 14th ; (Hon. Lt.) W. E. Harper, M.C., H. N. Stradling, J. W. Tattersall, April 20th ; P. S. Riach, May 1st.

To be temp. Sec. Lts. while empld. as Sec. Lts. (Tech.) :—S. K. D'A de Ferrars (Capt., Lond. R., T.F.), and to be Hon. Capt. ; A. J. Dick (Lt., H.L.I., T.F.), and to be Hon. Lt. ; (Hon. Capt.) C. B. Dick-Cleland (from A. and S. Lt.) ; C. E. Ebbutt (temp. Sec. Lt., Gen. List) ; J. C. Graddon (from Admin. Lt.), and to be Hon. Lt. ; W. Hill (temp. Sec. Lt., Gen. List) ; D. F. Hollins (temp. Sec. Lt., Gen. List) ; G. P. Harding, M.C. (from a Flying Officer Obsr.) ; J. A. Hone (from a Flying Officer Obsr.) ; W. A. Lepper (Lt., E. Kent R.), and to be Hon. Lt. ; C. L. Loyd (Lt., E. Kent R.), and to be Hon.

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)

Lt.; P. J. McChesney (temp. Lt., R. Fus.), and to be Hon. Lt.; A. M. R. Nicholson (Sec. Lt., Gen. List); G. W. North (Lt., L'pool R.), and to be Hon. Lt.; H. M. Over (temp. Lt., Gen. List), and to be Hon. Lt.; J. H. Reynold (temp. Sec. Lt., Gen. List); I. L. Roy (from A. and S. Lt.); H. L. Soulsby (Lt., R.F.A., T.F.), and to be Hon. Lt; W. R. Trounson (temp. Lt., M.G.C.), and to be Hon. Lt.; C. D. Watt (temp. Sec. Lt., Gen. List), April 4th.

Medical Branch.—T. Gibbons to be temp. Capt., from Admin. Capt., April 27th.

War Office, May 8th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Wing Comdr.—Capt. (temp. Lt.-Col.) L. A. Strange, M.C., Dorset R., an Asst. Comdt. (graded as a wing Comdr.), Central Flying School, and to retain his temp. rank while so empld., March 15th, seny. April 1st, 1917.

Flt. Comdrs.—From Flying Officers:—Capt. T. Wells, M.C., Yorks L.I., Spec. Res.; and to be temp. Capts. while so empld.—Lt. F. MacB. Paul, R. War. R.; Temp. Lt. E. H. Russell, Gen. List; Temp. Lt. C. W. Cudemore, M.C., Gen. List; Temp. Lt. L. G. Paget, Gen. List; Lt. H. C. Burdett, T.F. Res.; Temp. Lt. E. A. Worrall, Gen. List (since killed); Temp. Lt. C. C. Hayward, Gen. List; Lt. J. F. Lawson, R.G.A., T.F.; Temp. Sec. Lt. (temp. Lt.) W. Bruce, Gen. List; Sec. Lt. L. M. Van Eyssen, Spec. Res., Feb. 1st; Sec. Lt (temp. Lt.) K. K. Muspratt, M.C., Dorset R. (since killed), Feb. 11th; Capt. D. A. Tuck, Yeo. T.F.; Capt. S. H. Starey, Shrops L.I., Spec. Res., March 1st; Temp. Capt. W. H. Haynes, D.S.O., Gen. List; Temp. Capt. G. M. Boumphrey, attd. S. Lan. R.; and to be temp. Capts. while so empld.—Lt. R. W. Young, Spec. Res.; Lt. W. O. Phillips, Spec. Res.; Lt. L. F. Beynon, Mon. R., T.F.; Temp. Lt. E. T. Carpenter, Gen. List; Lt. N. E. Chandler, Spec. Res.; Lt. W. H. Demel, Manch. R., T.F.; Lt. D. E. P. Chaplin, R.A.; Lt. N. H. Colson, Spec. Res.; Lt. S. Hay, Spec. Res.; Sec. Lt. C. L. Milburn, Spec. Res.; Temp. Sec. Lt. E. C. Morris, Gen. List, March 15th; Capt. G. Chadwick, Manch. R., T.F., March 27th.

Special Appt. (graded as a Park Comdr.).—Lt. (temp. Capt.) F. W. H. Lerwill, Spec. Res., an Equipt. Officer, 1st Cl., and to be temp. Maj. while so empld, March 25th.

War Office, May 9th.

REGULAR FORCES.—Establishments.—R.F.C.—Mil. Wing.—Flt. Comdrs.—From Flying Officers, and to be temp. Capts. while so empld.:—Lt. C. L. Veitch, N. Lan. R., T.F.; Lt. S. H. Bell, Spec. Res.; temp. Lt. B. McEntegart, Gen. List; temp. Lt. G. O. Venn, Gen. List; Lt. P. Warburton, R.G.A., T.F.; Lt. W. E. Dawson, R.F.A., T.F.; temp. Lt. C. Pilkington, Shrops. L.I., and to be transfd. to R.F.C. Gen. List; Lt. S. L. Quine, M.C., Ches. R., Spec. Res.; temp. Lt. S. H. Preston, Gen. List; Lt. M. Minter, Spec. Res.; temp. Sec. Lt. (temp. Lt.) G. le B. Diamond, attd. Essex R., and to be transfd. to R.F.C. Gen. List; Sec. Lt. N. H. England, Spec. Res.; temp. Lt. G. A. D. Hancock, Gen. List; temp. Sec. Lt. A. Muir, Gen. List; Lt. W. B. Young, Spec. Res.; Lt. J. G. Aronson, R. Lan. R., Spec. Res.; temp. Lt. R. S. S. Ingram, Gen. List; Lt. L. L. M. Evans, Spec. Res.; temp. Lt. W. T. Price, M.C., attd. R. War. R., and to be transfd. to R.F.C., Gen. List; temp. L. C. Burcher, Gen. List; Lt. F. O. Cave, M.C., Rif. Brig.; Sec. Lt. G. G. Callender, Spec. Res.; Sec. Lt. (temp. Lt.) G. W. N. R. Haynes, R. Muns. Fus., and to be secd.; temp. Lt. C. L. Blake; temp. Lt. D. V. Armstrong, Gen. List; temp. Lt. T. S. Edelston, Gen. List, March 1st; Lt. D. J. Nickle, Canadian Forestry Corps, March 30th.

Equipt. Officers, 1st Cl.—Sec. Lt. (temp. Lt.) A. Graham, Spec. Res., from the 2nd Cl., and to be temp. Capt. while so empld., Feb. 7th.

Territorial Force Reserve.—Gen. List.—Capt. L. J. Robertson, from R.D.C., to be Capt. for duty as Courts-Martial Officer, R.A.F., retaining his seny., April 1st.

War Office, May 10th.

REGULAR FORCES.—Establishments. — R.F.C. — Mil. Wing.—Flt. Comdr.—Temp. Lt. C. A. Taylor, Gen. List, from a Flying Officer, and to be temp. Capt. while so empld., Jan. 1st.

Schools of Instrn.—Central Flying School.—Instr.—Lt. (temp. Capt.) C. D. Fellowes, M.C., Yeo., T.F., a Flt. Comdr., vice Lt. (temp. Capt.) H. W. G. Jones, M.C., Welsh R., T.F., March 31st.

Air Ministry, May 10th.

R.A.F..—The following temp. appts. are made at the Air Ministry:—Staff Officer, 2nd Cl.—Lt. (temp. Capt.) W. P. Groves, and to be temp. Maj. while so empld., vice Capt. (temp. Maj.) Hon. M. Baring, April 27th.

Staff Officers, 3rd Cl.—Capt. (actg). Maj.) Hon. L. G. W. Guest, Lt. (temp. Capt.) S. T. Ravenscroft, April 27th.

The following temp. appts. are made:—Col. (temp. Brig.-Gen.) J. F. A. Higgins, D.S.O., to be Area Comdr. and to be temp. Maj.-Gen. while so empld., vice Lt.-Col. (temp. Brig.-Gen.) C. A. H. Longcroft, D.S.O., April 29th; Lt.-Col. (temp. Col.) G. M. Griffiths to retain his temp. rank while empld. as Dir. of Aeronautics, April 1st.

Div. Comdr.—Lt.-Col. (temp. Maj.-Gen.) W. G. H. Salmond, D.S.O., and to retain his temp. rank while so empld., April 1st.

Brig. Comdrs.—Lt. Col. (temp. Brig.-Gen. in Army), A. E. Borton, D.S.O., and to retain his temp. rank while so empld.; Lt.-Col. (temp. Brig.-Gen. in Army) P. L. W. Herbert, and to retain his temp. rank while so empld., April 1st.

Group Comdr.—Lt.-Col. (temp. Col.) U. J. D. Bourke, and to retain his temp. rank while so empld., April 1st.

Staff Officers, 1st Cl.—Maj. (temp. Lt.-Col.) C. Fraser, M.C., and to retain his temp. rank while so empld.; Maj. (temp. Lt.-Col.) (now temp. Col.) N. D. K. MacEwen, D.S.O., and to retain his temp. rank while so empld., April 1st.

Staff Officers, 2nd Cl.—And to be temp. Majs. while so empld. if not already holding that rank:—Capt. W. B. Adams, Capt. O. T. Boyd, M.C., Capt. (temp. Maj.) W. D. Long, Capt. (Hon. Maj.) N. M. Martin, Lt. (temp. Capt.) C. E. Wardle, Lt. (temp. Capt.) C. W. Wise, April 1st.

Staff Officers, 3rd Cl.—And to be temp. Capt. while so empld. if not already holding that rank:—Lt. (temp. Capt.) W. L. Birch, Lt. (temp. Capt.) V. Buxton Sec. Lt. (Hon. Lt.) K. A. C. Creswell, Capt. W. G. M. Crothers, Capt. R. B. C. M. T. de Poix, Capt. (temp. Maj.) G. Disney, C. C. Hansford (Lt., R.H. and R.F.A., T.F.), and is granted a temp. commn. as Lt., Lt. (temp. Capt.) J. McGlen, Capt. T. C. Macauley, M.C., Capt. C. H. Smith, Capt. C. C. Treat, April 1st.

Flying Branch.—Lt. (temp. Capt.) W. R. B. McBain to be temp. Maj. while empld. as Maj. (Flying), April 11th; Lt. (temp. Capt.) M. A. Hancock relinquishes the rank of temp. Capt. on appt. as temp. Lt. (Flying), April 26th. Lts. to be temp. Capts. while empld. as Capts. (Flying):—S. Stanger, April 16th; G. H. Bush, April 21st; C. J. S. Dearlove, L. H. Jones, O. J. F. Scholte, May 4th; Lt. (Lt. Can. Local Forces) J. H. V. Cameron relinquishes his commn. on ceasing to be empld. on acct. of ill-health contracted on active service, May 11th.

Administrative Branch.—C. F. Apthorp is granted a temp. commn. as Lt., April 1st.

Technical Branch.—Sec. Lt. M. Cohen to be temp. Lt. while empld. as Lt. Tech., April 1st.

Memoranda.—All Warrant Officers, 1st Class (and Warrant Officers, R.N., with seny. prior to May 18th, 1915) who on March 31st were serving with the R.N.A.S. are granted temp. commns. as Lts. in the Royal Air Force with effect from April 1st.

All Warrant Officers, 2nd Cl. (and Warrant Officers, R.N., with seny. of or subsequent to May 18th, 1915) who on March 31st were serving with the R.N.A.S. are granted temp. commns. as Sec. Lts. in the Royal Air Force with effect from April 1st.

Lt. C. F. Apthorp to be temp. Capt. while specially empld., April 1st.

War Office, May 11th.

REGULAR FORCES.—Staff.—The following appointment is made:—Special appointments.—(Graded for purposes of pay as a Staff Capt. whilst comdg. a Sqdn., R.F.C., Cdt. Wing.)—Capt. P. C. Suckling, attd. R. Fus., and to be transfd. to R F.C., Gen. List, March 1st.

Attd. to Hdqr. Units.—Brig. Maj.—The surname of Lt. (temp. Capt.) T. M. Eggar, Lond. R., T.F., and R.F.C., is as now described, and not as in the "Gazette" of April 17th.

Establishments.—R.F.C.—Mil. Wing.—Instr. in Gunnery (graded as an Equipt. Officer, 1st Cl.).—Sec. Lt. P. H. R. Whittet, M.C., Spec. Res., an Equipt. Officer, 3rd Cl., and to be temp. Capt. while so empld., March 24th.

Adjt.—Lt. (temp. Capt.) C. W. Pollock, Durh. L.I., Spec. Res., from a Garr. Bn., R. W. Fus., Dec. 18th, 1917.

Equipt. Officer, 1st Cl.—Capt. O. I. Preston, M.C., Notts and Derby R., T.F., from the 2nd Cl., Nov. 27th, 1917, seny. Sept. 20th, 1917. (Substituted for notification in "Gazette" of Feb. 26th.)

Schools of Instrn.—School of Mil. Aeronautics.—Asst. Comdt. (graded as a Park Comdr.).—Maj. (Capt., Res. of Officers) W. J. Locker, N. Staff. R., Spec. Res., Jan. 1st.

Armament School.—Instr. in Gunnery (graded as an Equipt. Officer, 1st Cl.).—The appt. of Sec. Lt. (temp. Capt.) P. H. R. Whittet, M.C., Spec. Res., notified in "Gazette" of April 22nd, is cancelled.

CORRIGENDUM TO "MENTIONS IN DISPATCHES."

Supplement to the "London Gazette," dated Jan. 16th, 1918:—Under R.F.C.—Buchanan-Wollaston, Lt. H. J., Yeo.

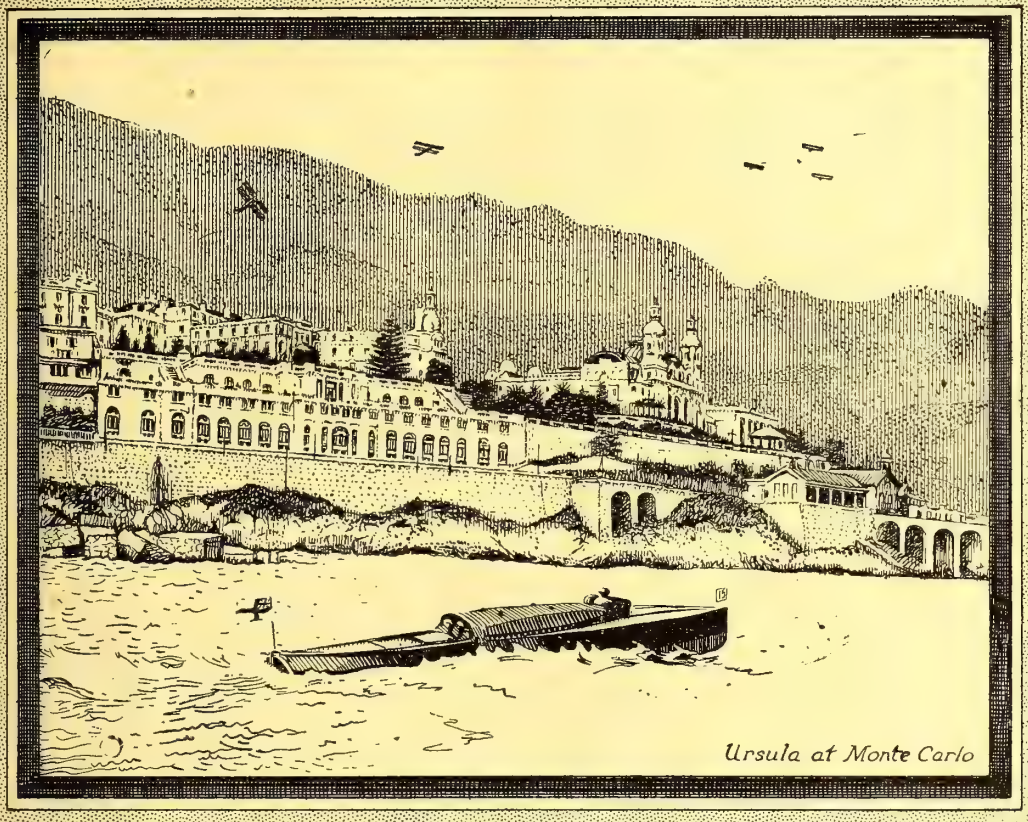
War Office, May 13th.

The King has been pleased to approve of the following Awards to the following Officers and Warrant Officer, in recognition of their gallantry and devotion to duty in the field:—

A Bar to the Military Cross.

Sec. Lt. (Temp. Capt.) D. J. Bell, M.C., R.F.C., Spec. Res.

He has led his formation with great skill and has destroyed three enemy aeroplanes and driven down two others, one of which was seen to be completely out of control. The high state of efficiency which his flight has attained is due to his splendid


Ursula at Monte Carlo

SAUNDERS of COWES

S. E. Saunders, Ltd.

Designers & Constructors of Air & Marine Craft

EAST COWES. I.W.

Telegrams "Consuta" E Cowes.
Phone Cowes 193. (4 Lines.)

SB AC
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

example and fearless leadership. (M.C. gazetted June 18th, 1917.)

Capt. W. S. F. Johnson, M.C., Yeo. and R.F.C.

Whilst escorting machines of another squadron which were engaged in bombing work with one other officer he attacked ten enemy scouts. He destroyed two of them and forced another to land. On another occasion, when leading a patrol of six machines, he attacked ten enemy scouts. He destroyed one, and his patrol accounted for three others. A few minutes later, in conjunction with another officer, he destroyed an enemy two-seater machine of a new type. As a flight commander he showed great skill, and by his daring and good leadership set a splendid example to the officers of his flight. (M.C. gazetted July 3rd, 1915.)

Lt. S. S. Jones, M.C., S. Lan. R. and R.F.C.

As an observer he took part in two long-distance bombing raids and in raids on enemy aerodromes. He carried out several long-distance reconnaissances over the enemy's lines, taking a large number of photographs, from which valuable information was obtained. On one occasion, when his machine caught fire, at a height of 4,000 feet, and was wrecked on landing, he showed great promptitude and presence of mind in extricating the pilot and extinguishing his clothes, which were on fire. He always showed great skill and gallantry, and set an excellent example to the observers of his squadron. (M.C. gazetted Jan. 1st, 1917.)

Temp. Capt. F. G. Quigley, M.C., Gen. List and R.F.C.

In aerial combats, he destroyed five enemy machines and one balloon, and drove down four enemy machines out of control. He showed splendid courage and initiative. (M.C. gazetted Feb. 18th, 1918.)

The Military Cross.

Temp. Capt. C. H. Brewer, Bedford R. and R.F.C.

He set out to make a special railway reconnaissance, and though the weather conditions became very bad he continued his task with the greatest determination. His engine began to fail when he was a long distance over the enemy's lines. By skilful piloting he succeeded in crossing the enemy's trenches, but the machine crashed in "No Man's Land," and turned completely over. Heavy machine-gun fire was opened by the enemy, and though his jaw was broken he extricated the observer, who was pinned under the machine and was unconscious, and dragged him to a shell hole in the face of the enemy's fire. He showed splendid courage and resource.

Lt. T. W. Cave, R.F.A., attd. R.F.C.

While engaged in taking photographs of an enemy area he was slightly wounded by anti-aircraft fire. In spite of this and the enemy's fire 17 photographs were taken. Later, while he was again taking photographs over the enemy's lines, his machine was attacked by 12 enemy machines. He shot down one of them completely out of control, after which several photographs were taken. On three occasions, in the course of flights lasting four hours or more, he ranged a siege battery most effectively on hostile batteries, with the result that several gun-pits were destroyed and three explosions were caused. He showed splendid determination and initiative.

Temp. Sec. Lt. J. S. Chick, Gen. List and R.F.C.

While leading a patrol of four machines over the enemy's lines he attacked an enemy two seater machine, which his observer drove down completely out of control. Shortly afterwards, the patrol engaged 19 enemy machines; he dived onto the uppermost machine, and drove it down in a series of spins and side-slips completely out of control. He then attacked two others and brought them down in the same manner, while his observer drove down another out of control. On another occasion his formation, consisting of five machines, attacked 25 enemy aeroplanes. He destroyed one of the enemy and drove down another out of control. He set a magnificent example of courage and skill.

OFFICIAL COMMUNIQUES.

NAVAL.

Admiralty Communiqués.

May 13th.—On May 10th one of our seaplanes in the North Sea sighted a Zeppelin on patrol. An indecisive action lasting half an hour took place, and ended in the retreat of the Zeppelin to its base.

During the period May 6th-12th inclusive, Air Force contingents working from Dunkirk carried out successful bombing operations against Ostend docks and seaplane base, Zeebrugge Mole and lock gates, and enemy shipping in the vicinity.

Several direct hits were obtained on sheds on Zeebrugge Mole, and a large shed at Ostend seaplane base was completely burnt out.

In the course of offensive patrols six enemy machines were destroyed and a further two driven down out of control.

One of our machines is missing.

MILITARY.

G.H.Q. Communiqués.

May 7th, 7.52 p.m.—Rain prevented flying on the 6th inst. until 5 p.m. After this hour some fighting took place, in which six hostile machines were brought down.

One of our aeroplanes is missing.

After dark 100 bombs were dropped by us on targets in the neighbourhood of Bapaume.

One of our machines has not returned.

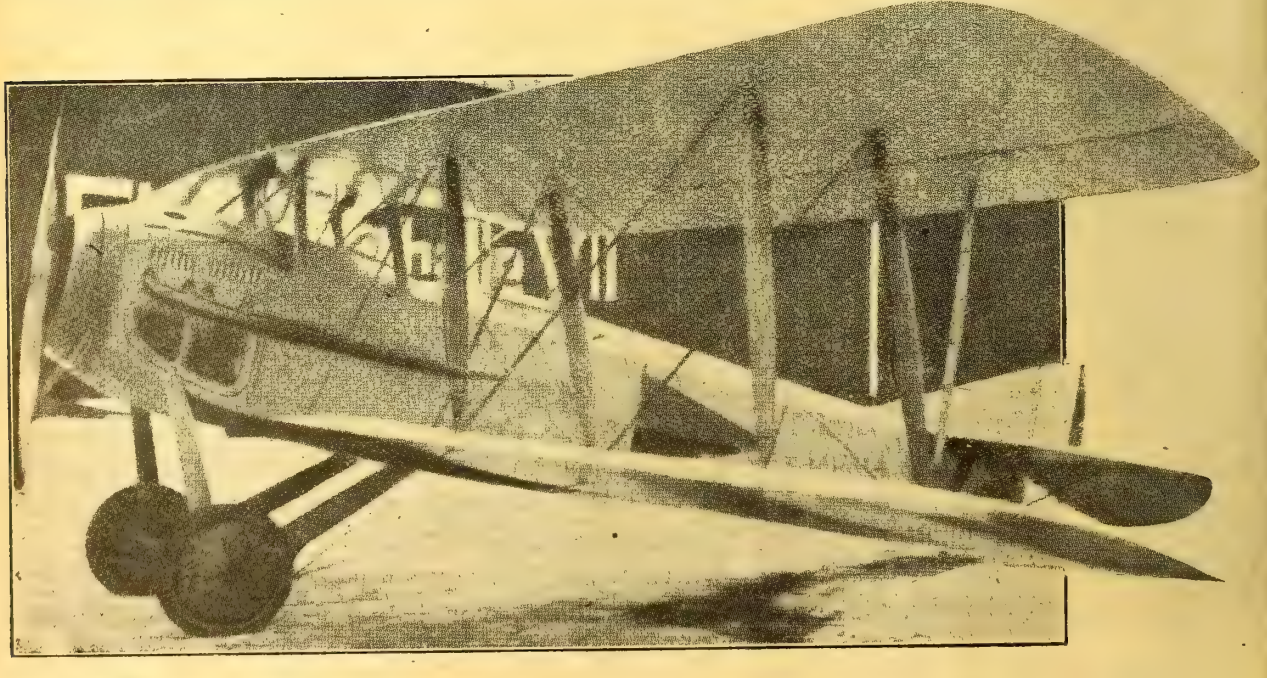
May 8th, 8.20 p.m.—On the 7th inst. flying was again impossible until after 5 p.m. owing to rain.

The weather then cleared suddenly, and machines were sent out on reconnaissances and bombing flights. Four hundred bombs were dropped by our aeroplanes on different targets all along the front.

Twelve hostile machines were brought down in air fighting, eight of which were accounted for in a big encounter in the neighbourhood of Douai. One German observation balloon was brought down in flames.

None of our machines is missing.

May 9th, 8.40 p.m.—On the 8th instant the weather was fine, but little work in the air was possible south of Arras owing to the heavy mist which hung over the lines.



Reproduced from "Flugsport."

A Two-seater Spad biplane captured by the Germans, said by the enemy to be a British machine.

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines
like
Rolls-Royce Cars
are the
Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

On the northern portion of the front our aeroplanes were actively employed all day reconnoitring, taking photographs, co-operating with the artillery, and bombing.

Ten tons of bombs were dropped by us on Le Câteau, Cambrai, Bapaume, and on the docks and mole at Zeebrugge.

In the northern area strenuous fighting took place throughout the day. Twenty-two hostile machines were brought down and seven others were driven down out of control. Another German machine was shot down by machine-gun fire from the ground.

Seven of our aeroplanes are missing.

Owing to the mist, only a few of our aeroplanes were able to go out after dark. A ton of bombs were dropped, however, on the railway stations at Douai and Marcoing.

All our machines returned.

May 10th, 9 p.m.—On the 9th inst. cloudless weather enabled our aeroplanes to carry out a full day's work. Machines were in the air all day, observing for the artillery, reconnoitring, and taking photographs of the enemy's back areas.

Our bombing machines displayed great activity on the whole front. A total of over 24 tons of bombs was dropped by us on different targets, including important railway stations at Tournai, Douai, Marcoing, Chaulnes, and Cambrai, and the billets of Carvin, Péronne, and Chipilly, and the docks at Zeebrugge.

Fighting in the air took place more or less continuously, but became particularly fierce towards dusk. Twenty-seven German machines were brought down and 12 others were driven down out of control. A hostile observation balloon also was destroyed.

Six of our machines are missing.

During the night four and a half tons of bombs were dropped by us on the docks and the entrance to the canal at Ostend, and a further three and a half tons on Péronne, Chaulnes, and Bapaume.

All our machines returned.

May 11th, 8.45 p.m.—On the 10th instant low clouds and mist prevented flying till 5 p.m., and after this hour the weather cleared on a small part of the front, and great aerial activity took place in this sector until dark.

Oven 14 tons of bombs were dropped by us on Peronne, Bapaume, Thielt, Douai, Zeebrugge, and the docks at Bruges. Hostile scouts were very active, and made repeated attacks on our bombing machines.

Eight German aeroplanes were brought down in air fighting, and six others were driven down out of control.

Nine of our machines are missing.

One of our aeroplanes reported missing on the 7th instant has since returned.

May 12th, 7.55 p.m.—On the 11th instant, except for a short period of clear weather in one sector, in which bombing and reconnaissance work were carried out by our aeroplanes, the whole front was enveloped in mist throughout the day.

One hostile machine was brought down in air fighting.

Two of our machines are missing.

It has been ascertained that three other German machines were brought down on the 10th instant, in addition to the eight previously reported.

May 13th, 9.10 p.m.—On the 12th inst. flying was again impossible until evening. Visibility was then excellent, and our aeroplanes were able to carry out a great deal of successful work in conjunction with the artillery.

Over eight tons of bombs were dropped on targets in the neighbourhood of Menin, Armentières, and La Bassée, and on the docks at Bruges.

In air fighting six hostile machines were brought down.

One of our machines is missing.

During the night 14 tons of bombs were dropped on the railway stations at Don, Marcoing, and Chaulnes; on Bapaume, Péronne, and on the docks at Bruges. One of our machines has not returned.

War Office Communiqués.

May 8th.—The G.O.C. Italy reports:—

The Royal Air Force has, since my last report, destroyed 17 hostile aeroplanes and brought down one out of control. Several of these have fallen in our lines. During this period we have lost no machines. Targets of military importance in rear of the hostile lines have been bombed, with good results.

May 8th.—The G.O.C. Mesopotamia reports:—

A portion of our troops entered Kirkuk on Tuesday without opposition.

The Turks, who retired towards the Lesser Zab River, abandoned three damaged aeroplanes.

May 9th.—The G.O.C. Macedonia reports:—

Early on the morning of May 1st five of our machines bombed the aerodrome at Rudova (in the Vardar Valley, north-west of Lake Doiran). One large shed was destroyed, and bombs were observed to fall among 12 aeroplanes on the ground. The same aerodrome was again bombed on the evening of May 7th, when a direct hit was obtained on a workshop and bombs were seen to fall close to 16 machines which were counted on the ground.

On May 8th Drama aerodrome was bombed early in the morning and again at 4.30 p.m. Considerable damage was caused, and all the bombs dropped were seen to burst among the hangars and the machines lying on the ground.

All our aeroplanes returned safely.

On May 4th a hostile machine was brought down behind our lines near Dimitric (at the head of Lake Tahinos), the German pilot and observer being killed.

May 11th.—The G.O.C. Mesopotamia reports:—

On May 8th our aeroplanes attacked Turkish camps at Fathah (on the Tigris, 32 miles north of Tekrit). A large number of bombs were dropped, and hostile troops and transport were fired on with machine-guns.

A Turkish aeroplane was shot down and destroyed near the junction of the Lesser Zab with the Tigris (55 miles west of Kirkuk).

May 13th.—The G.O.C. Mesopotamia reports:—

On May 11th the enemy was driven across the Lesser Zab at Alton Keupri.

On the following day our aeroplanes bombed hostile camps between Alton Keupri and Erbil (Arbela) and also on the Tigris.

THE CASUALTY LIST.

MILITARY.

Reported May 8th.

Killed.—Collier, Lt. S., M.C., Manch. R., attd. R.F.C.

Previously reported Missing, now reported Killed.—Bedson, Capt. E. H., Manch. R., attd. R.F.C.
Rouquette, Lt. D. G., R.F.C.
Wade, Sec. Lt. R. C., R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Shakesby, Sec. Lt. C. V., E. Yorks R., attd. R.F.C.

Canadian Force.—Previously reported Missing, now reported Prisoner in German Hands.—Dean, Lt. A. C., Cent. Ont. R., attd. R.F.C.

Reported May 9th.

Australian Force.—Previously reported Missing, now reported Prisoner in German Hands.—Feez, Lt. C. M., A.F.C.

Reported May 10th.

Previously reported Missing, now reported Prisoner in German Hands.—Watson, Lt. N. T., Middx. R., attd. R.F.C.

Australian Force.—Killed.—Storch, Lt. L. A., A.F.C.
Wounded.—Malley, Capt. G. F., A.F.C.

Reported May 11th.

Previously reported Missing, now reported Prisoners in German Hands.—Fluke, Lt. W. G., D.S.O., S. Staff R., attd. R.F.C.
Ivamy, Sec. Lt. W. G., R.F.C.
Lee, Sec. Lt. E. B., R.F.C.
Mayne, Sec. Lt. R. A., R.F.C.
Payne, Sec. Lt. H. A., R.F.C.
Russell, Sec. Lt. G., R.F.C.
Thackrah, Sec. Lt. N. H., R.F.C.
Vaughan, Sec. Lt. D., R.F.C.
Wilson, Sec. Lt. T. S., R.F.C.

Canadian Force.—Killed.—Sweeney, Lt. L. J., B.C., R., attd. R.A.F.

Previously reported Missing, now reported Prisoner in German Hands.—Mercer, Lt. G. A., Can. Cyc. Corps, attd. R.A.F.

Reported May 13th.

Previously reported Missing, now reported Prisoner in Austrian Hands.—Jerrard, Lt. A., V.C., S. Staff. R. and R.F.C.

* * *

Casualty Among Men. The Date is that of the Official List. Australian Imperial Force.—Accidentally Killed.—May 3rd. A.F.C.: Marsden, 2628 S. N.

* * *

The following soldiers, who were prisoners of war in Germany, have arrived in Holland for internment.

May 1st.—R.F.C.—Donald, 3022 T. H.; Jones 2104 E.; Judge, 494 V.; Piper, 470 N.V.

May 4th.—Walker, 9329 A. G.

The following officers, who were prisoners of war in Germany, have arrived in Holland for internment.

May 8th.—Aked, Lt. H. L. C., W. Y. R., and R.F.C.; Atkinson, Lt. J. M., A.S.C., attd. R.F.C.; Brown, Sec. Lt. C., R.F.C.; Brown, Lt. W. A. S., Arg. and Suthd. Highrs. and R.F.C.; Cairnduff, Lt. A., R. Muns. Fus., attd. R.F.C.; Castle, Lt. J. S., R.F.C.; Golding, Sec. Lt. K. L., R.F.C.; Goodson, Sec. Lt. A. R. L., Lond. R. and R.F.C.; Grinnell-Milne, Capt. D., R.F.C.; James, Capt. C. E. H., Welsh R., attd. R.F.C.; Joyce, Lt. W., Bed. R., attd. R.F.C.; Lerwill, Lt. O., R.F.C.; Littlewood, Lt. S. C. T., L.N. Lan. R., attd. R.F.C.; Maxwell, Lt. G. E., R.F.C.; Mortimer-Phelan, Lt. W. C., R.F.C.; Newbold, Lt. L. A., Essex R., attd. R.F.C.

Canadian Force.—Owen, Capt. D. W., Manch. R., attd. R.F.C.

May 14th.—Daly, Capt. A. P. V., Conn. Rang., attd. R.F.C.; Wyman, Sec. Lt. J. B. H., R.F.C.

Canadian Force.—Davis, Lt. D. W., Sask. R., attd. R.F.C.

(*Continued on page 1833.*)

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  **AS A DRUM.**

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren Piccy, London."
"Phone—280 Gerrard

Also at

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

THE SUPER-AVIATION CO. LTD.

Aeronautical Designers, Constructors and General Engineers.

MANUFACTURERS OF

COMPLETE

MACHINES

and SPARES

CONTROLLED ESTABLISHMENT under the WAR MUNITION ACT.

HEAD OFFICE :—

DUDDENHILL LANE, WILLESDEN, N.W.10.

Telephone : WILLESDEN 642.

Telegrams : "SUPAVICOL," LONDON.

Managing Director—N. LEWIN, A.C.Mech. E.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

South Lodge,

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The British Aircraft Industry.

(SECOND SERIES.)

BY R. P. HEARNE.

X.—THE DAVIDSON AVIATION CO.

We have no lack of geniuses and cranks in the Aircraft Industry, but we could do with some more really good business men. By business men I do not mean "hot air merchants," speculators, and other mushroomy individuals; I mean level-headed and responsible men, who have skill and experience in organising a business, and in handling workers and clients satisfactorily—men, in short, who can build up a sound industry and make it pay.

I have omitted one quality from the list of essential requirements in a successful business man, and it is so important, in the Aircraft Industry particularly, that special attention must be drawn to it. We have it summarised in one magic word—Output. On this vitally essential requirement your genius and your crank usually fail; whilst on the other hand the "hot air merchant" is distinguished more by his output of words than of work. The mushroom man or the gambler who who takes up a new industry fails also in this matter of output, for he may rush out a great deal of stuff, but it is of such shoddy quality that it is merely waste of material.

The sound business man must give quality as well as quantity output, and with aircraft work in time of war I need not dwell on its immense importance.



Mr. Percy L. Mott. Mr. W. Ewart Chester.

I am glad to say that I have met many excellent men of business in our Aircraft Industry, and amongst them I can include Mr. W. Ewart Chester, the founder and managing director of the Davidson Aviation Company. Although this company has only come into existence since the war, and although its rise has been phenomenally rapid, I venture to say that it will continue to be as useful and active when peace comes as it is to-day.

Previous Experience.

We cannot consider Mr. Chester as a newcomer to the industry in the same sense as if he had been a cheese merchant or a farmer, for example, before he soared into the aerial firmament. It was quite a natural evolution. His whole business career previously had been in connection with woodwork on a large scale, and this training had been effected with one of the leading firms in this country. Both before and during the early stages of the war Mr. Chester had gained valuable experience in factory organisation and management.

His task, therefore, was to adapt his knowledge in woodwork and factory organisation to aeroplane construction, and it was a foregone conclusion that he would succeed in the effort.

Starting with twenty-four men two years ago Mr. Chester has built up an organisation which now controls six important factories employing a very large number of men and women. And as the tale unfolds it will be seen how enterprising the Davidson Company is.

Originally the firm was engaged on minor contracts; but from the first it must have attracted attention by the manner in which it carried out every job entrusted to it. The expert business man knows to the full the importance of being up to time and sample with his deliveries of goods. Mr. Chester was bold enough to accept contracts which were difficult of accomplishment within the time given, but his knowledge of production saved him from taking on any impossible contract and failing to carry it out.

I believe that some people in the trade call the Davidson Company "the S.O.S. firm," in in that you apply to them in time of great stress to help you out with a difficult contract, and if they agree to do so you may rely on them. The powers that be have discovered the same useful quality, and thus there has been a very great expansion in the activities of the Davidson Company.

It must be rare indeed for the one firm to be engaged in cutting down timber, drying it, using it for aeroplane work, making metal parts for aeroplanes, and also making other vehicles. That is a bald statement of the Davidson work to-day. Let me develop the theme.

The firm buys its own timber, in some cases purchasing standing trees, cutting them, and lorrying them to their own sawmills. At these mills is installed a Sturtevant drying plant, which enables the wood to be rapidly prepared for use. One does not imply, of course, that the whole supply can be obtained in this manner; but none the less, the new drying plant is of immense assistance in the present emergency.

Organisation.

In the various Davidson factories one may see a great variety of aircraft work under progress, and though Mr. Chester has been handicapped in that he had to take over existing buildings and adapt them to new requirements he has been wonderfully successful.

I took careful note during a surprise visit to the various factories, and I observed how well the work was fed up to each department. There is no worse sympton of bad management than to see this and that section of a factory held up or going slow because they are being starved in supplies by the other

departments. The workers get slack and dissatisfied; you see messengers flitting to and fro; there is confusion and bandying of complaints between the various "shops," and output is being delayed.

One of the Davidson sub-factories is an old cinema hall, narrow, long, and about as ill-fitted for aircraft work as any building could be. Yet so well is it laid out that I noted a smoother and brisker movement of work than in many an up-to-date factory with every facility, but lacking in the vital essential of good management.

In the larger works, where Mr. Chester and his staff have had better opportunity, we see even more clearly the benefit of good organisation. The productivity indeed seemed extraordinarily good.

I noticed this especially in the engineering works which have been built by the company for the manufacture of metal fittings and parts, etc. This is a miniature factory as modern factories go, but I think that in output per square foot of space it must be near the record. The machines and workers are packed in like the mechanism of a watch, and yet, as in the manner of the timepiece, there is no congestion, and all the work goes on smoothly. The variety of the jobs in hand was noteworthy also, and I was specially pleased to note that many discharged soldiers were amongst the diligent workers.

The Choice of Assistants.

Mr. Chester has the good business man's skill for delegating the work to responsible and well-chosen men. He does not run round trying to superintend every little task himself. (These two sentences are worth thousands a year to various clever men who conduct their businesses on the wrong lines. And to avoid hurting their feelings whilst giving this precious advice I confess that in my own tiny affairs I have not the business ability to follow my own advice, though I know it is right. One is born either a good or a bad man of business. There is no altering that fact; and the only improvement possible is to recognise that for all of us there are certain things which the other fellow can do better.)

The value of being a good business man and of being able to delegate authority is that the head of the firm can find time to work out new developments. I have often spoken to the mismanagers of tin-pot shows, and they buzzed about like bees in the frantic endeavour to do everything's work. A firm of this kind could never expand successfully. Any accidental expansion would produce a burst.

I do not wish to make out Mr. Chester to be a paragon in any way. But, undoubtedly, he is a very good business man. As such he is rare and valuable. Applying to him all the tests of business ability that I know of, I find his ability well proved. The most trying test is that of being able healthfully to expand business. Already I have shown how the Davidson Company has grown in two years to possess its own saw-mills, aircraft manufacturing plant, and engineering works.

Manifold Activities.

Not content with that, Mr. Chester has taken over other kinds of manufacture for the Government at short notice. He quite candidly confesses that he knew nothing about this work. But when asked to make it he found the men to guide him; he picked out at once a suitable factory building from which the occupants were bought out at 24 hours' notice, and ere the new works were ready he had his staff preparing the raw materials in another building. In this way he coped with the problem of carrying out his first contract up to time.

I could give many other instances of the enterprise which the Davidson Company manifests, but at the moment it is not expedient. The list already furnished is more than sufficient to show how active this firm is. Mr. Chester is laying his plans well ahead, and I wish I could set out how ingeniously he is preparing for the future. He is one of the men who do not mean to shut up their factories and dismiss their hands when peace comes. He seeks to adapt his works and his workers to the new conditions that will arise. If aeroplanes are not required in immense quantities, then his wood-workers and engineers will be switched on to other suitable work for which there is a demand, or a possible demand.

Steel Tubes, Tube Manipulation, and Tubular Structures for Aircraft.

Continued.

A most interesting paper was read before the Aeronautical Society on Thursday, May 2nd, by Messrs. W. W. Hackett and A. G. Hackett, of Accles & Pollock, Ltd., the famous tube manufacturers, of Oldbury, Birmingham, the first half of which was reprinted last week.

Mr. A. G. Hackett, who is the Accles & Pollock specialist on tube manipulation, jointing, etc., continued the lecture from this point of view. He said:—

Tube Manipulation.

The possibilities of tube manipulation such as butting, tapering, drawing with taper gauge, expanding, flanging, bending, lapping, etc., are becoming better understood. Some designers, however, whilst recognising the usefulness of these different operations, still ask for what is not commercially possible, because they fail to make allowances for the alteration in the thickness of the tube which will occur as the result of such operations. For instance, if the diameter of a tube is increased the thickness of the wall is reduced, and if decreased in diameter the thickness is increased. Again, if a tube is flanged, the flange will not be of uniform gauge, but will decrease in thickness as it increases in diameter.

A section of a bent tube cut from an F.2.B. undercarriage "V" strut shows that the gauge of the tube has, by bending, been reduced on the outside of the curve from .061 in. to .048 in., and increased on the inside from .061 in. to .072 in. The thinning of the tube would cause it to break if it had not been properly annealed; and further, if proper mandrils had not been used, or the tubes had not been filled with suitable material, a series of "puckers" or "corrugations" would have been formed on the inside of the bend. Where proper thickening up of the wall along the inner curve takes place in bending the bent portion of the tube is the strongest, but if "puckering" takes place this point becomes the weakest.

Bending is sometimes carried out with steel tubes in the hot state, but where strength is required this is bad practice, as by heating the tube is rendered much weaker than it would be if bent in the cold state. Of two "V" struts, one bent in the hot and the other in the cold state, and the same weight being applied in each case, it will be seen that the tube bent while hot has been distorted much more than the other.

Tubular Joints in Aircraft Construction.

Generally speaking, structural work for aircraft purposes is to-day carried out by means of sockets placed in suitable positions and arranged to receive the ends of the various tubular cross-members and bracings. These tubes and sockets are connected in three or four ways, namely:—

By brazing.
By silver-soldering.
By soft-soldering.

Sometimes the sockets or lugs are dispensed with, in which case the cross-tubes are mitred and welded direct to the main tube.

The latter method is not advisable except in very rare instances, as any operation involving great heat is dangerous, owing to the weakening which results from the annealing or perhaps burning of the steel.

Another method is sometimes employed in which the cross-bracings are connected by means of a hinge joint to a sleeve on the main tube (i.e., a trapped end tube with a nut and bolt).

Of types of lugs used in aircraft structural work, perhaps the most common is the lug made up by one long sleeve, with two branches mitred and welded on. Into and through these the main and branch members are fitted, and are held there, preferably, by soft-soldering and pegging. Another form of lug is made in two halves, pressed to shape, trimmed to depth, and welded along the joints. A wiring plate may be included. A three-way lug, with double wiring plate is common.

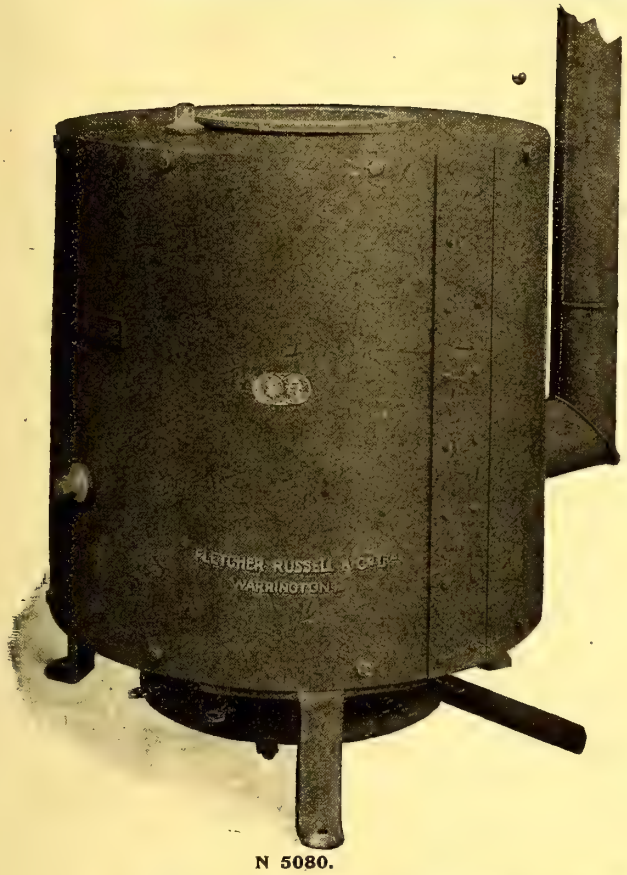
It will be useful to give the results of some comparative tests made on these various methods of jointing tubular structures, but before doing so we would remark that, in a paper like this, only the fringe of the subject can be touched. Everyone who is in any way connected with the practical side of aeronautical construction will readily call to mind many other types of joints, each designed for a special purpose or to overcome a constructional difficulty.

Soldering, Brazing, or Welding.

Speaking from an experience of at least eight years in which we have been in touch with aircraft construction and design, we have met with a surprising amount of fluctuation in the

Salt and Lead Bath Furnaces

Also OIL TEMPERING BATHS.



N 5080.

Gas Heated.

The recognised Process for Perfect and Regular Hardening.

For all Trade purposes.



N 5130

FLETCHER, RUSSELL & Co., Ltd.,

:: CENTRAL ROAD, ::

WARRINGTON.

respective popularity of soldering, brazing, welding, etc., for steel tube work, all these methods having been ruled out in turn, only again to find favour in certain quarters. This is partly due to the fact that machines designed by private manufacturers have been brought into great popularity, and the methods and designs of such makers adopted.

We have seen welding carried almost to excess and then almost abolished. Brazing has been boomed and then decried, and soft-soldering substituted for it—with a different type of lug or joint to allow for the reduced strength of the jointing material.

This, again, has been deemed unsafe, and silver-soldering, or hard-soldering, has risen into prominence, and to-day one hardly knows which type really is the popular one, as on the machines now being built for war purposes all styles and types of jointing may be found.

One has to realise that in all these methods the human element comes much into play. For instance, it is possible so to weld a joint that it appears to be sound, yet it may be a "fake"—metal being merely laid on and not fused with the surrounding parts. Or, again, the welded joint may be burnt, thus causing a dangerous weakening.

Similarly with brazing, it is possible with care to make a fine type of joint, but the probability is that in a certain percentage of cases overheating will take place and failure result.

We will now deal with the results of a few experiments recently carried out on certain of these types of joints.

Soft-Soldered Joints.

Let us take soft-soldering first. In all cases the tests were made with a soft-solder composed of 60 per cent. tin and 40 per cent. lead—using "Fluxite" or some similar article as a flux.

Tubes of various gauges were tried, but up to a certain point the strength of the soldered joint was such that the tube failed in tension without the joint giving way.

It was found that the strength of a soldered joint is much greater than it is generally supposed to be, and from experiments carried out, the clearance or thickness of the soldering material does not, between the limits of .001 in. and .008 in., make much difference, but for any components that can be guaranteed to size we would recommend as "thin" a joint as possible.

[A striking example of a strong joint of the soft-solder type was given, an elevator "bloater" and its tube being selected for the purpose. The test on this joint was carried out in order to prove to the satisfaction of inspectors that the stipulated minimum clearance of .005 in. on the diameter was not necessary. In this particular case the elevator lever (or "bloater") was held stationary while a torsional load was exerted on the tube. The result showed that the tube twisted and buckled without affecting the soldered joint.]

One of the chief arguments against the use of soft-solder is the reduction in strength resulting from vibration, it being claimed that this form of joint will not sustain a vibratory load nor a series of shocks. This may sometimes be right, but even under these conditions a very satisfactory result can be obtained if the sweating is done thoroughly and well, and added strength is given if the joint be "pegged."—[Much testing at from 1,200 to 1,800 impulses per minute is required to prove this point.—C. G. G.]

Tests on Soldered Joints.

The writers recently carried out some experiments on what may be termed a "Tup-testing machine" for soldered and brazed joints. It will be noted that the rising and falling tup or hammer is actuated by a bell crank lever, worked by a "sudden-drop" cam rotating in the direction of the arrow. The dead load on the tup shaft can be varied by means of the sliding weight.

[This consisted in fitting a tube into a lug or socket and then tapping—or "tupping"—it on the end to try and drive it further into the socket.]

A standard drop of 4 ins. was arranged.

It was at first thought that the effect of the "tup" action would be to quickly rupture the joint, but to our great surprise the joint held to such an extent that we found it necessary during the test to increase the load from 10lbs. to 24lbs. The following are the details of the test:—

Size of tube: 1in. outside diameter by 18-gauge.
Depth in socket (or lap): ½ in.
Thickness of solder: .005in.
Number of blows: 113,500 with 10lb. weight up.
Further number of blows: 64,000 with 24 lb. weight up.

At this stage the joint showed signs of giving way, so it was decided to apply a tensile test to see if the repeated blows had in any way deteriorated the solder. To our surprise the tube did not pull out until a load of 5.2 tons had been registered, giving the excellent result of 3.31 tons per super inch on the solder lining.

It may be urged that these results are not a fair basis on which to reckon, as they do not represent the ordinary work of the average operative. In answer, we would say that these results were all obtained from test pieces sweated by different operatives, in some cases being the work of girls with about two months' experience.

It may be possible to work out a formula to arrive at a basis for designers of soft-soldered joints, but even here, as in all calculations relating to structures, other factors have to be taken into account. For instance, a joint may be quite strong enough if in a 1in. by 20-gauge tubular joint the solder reaches to a distance of ½in., and working on this basis it follows that the same distance for a 2in. diameter tube of the same gauge would be correct, but no one would be satisfied with this, and would naturally double the length of socket to meet the increased diameter.

Generally speaking, it may be taken for granted that with ordinary care, and with a good quality of soft-solder, a joint can always be made to withstand a shearing stress of 2½ tons per super inch on the solder itself—provided (and this is the crux of the whole matter) that the articles are well tinned and cleaned prior to the operation of sweating.

As regards the apparatus for sweating, different people will have a different choice, but having tried soldering irons, blow-lamp, coal-gas jets, and hydrogen flame, we have found that the three latter are about equal, and each is better than a soldering iron alone, but this latter is necessary for finishing in awkward corners.

Eventually the use of a simple electrical device will probably become popular for repetition work.

Brazing.

As previously mentioned, this means of connection still has many adherents. There is, however, a great disadvantage attached to it, viz., the risk of burning the tube owing to the intense heat necessary. That this burning and consequent weakening does take place can be easily shown by the results of tests carried out by us on a cantilever testing machine.

The tests were upon tubes which had been fixed into sockets and brazed or soft-soldered, and showed the decided disadvantage of the brazed joint from the standpoint of strength.

A further series of tests was carried out on the alternating stress machine, and these results were similar.

Another point may be mentioned with regard to these tests. In one test the result was poor in comparison with the others. This joint was "faked," the tube and socket being left dirty and improperly tinned, in consequence of which the soldered joint had no "life." Even under these conditions the joint held for 75,130 revolutions, as against about 4,000 for the brazed joint. At this point the socket failed, due to the insecure fixing of the tube.

Another peculiar feature of this test was the heat generated in the brazed tubes due to the constant working of the molecules. The tubes commenced to warm up almost immediately, and, before they broke, the temperature of the tubes near to the points of fracture (i.e., near the socket) was about 120 deg. C., sufficient to cause the charring of any adjacent wood, whereas the soldered tubes remained quite cool until the last few minutes prior to fracture. [Presumably because the solder was too soft and spongey to transmit the effect of the blows, and so acted as a cushion.—C. G. G.]

We are quite aware that in many places on aircraft structures brazing is permissible and good, but where any weakening of a member is likely to cause disaster, brazing should be carefully avoided.

Silver Soldering or Hard Soldering.

The foregoing remarks as to brazing hardly apply to silver-soldering, as by this method a strong joint can be obtained without undue heat. We are not in a position at the moment to give any comparative figures of tests, but we should say that from the standpoint of tensile strength, silver-soldering is higher than soft-soldering, and very near to that of brazing. The heat necessary to perform the operation is lower than for brazing, and it is not likely to weaken any members if reasonable care is used. It is, however, a longer process, and the material used is very costly.

Welding.

We may well ask ourselves, in these days, where we should be without some form of autogenous welding. The thousand and one articles that are built up of sheet metal welded together speak for themselves, and make us wonder how we ever got on without this useful engineering process.

Still, welding has it limits of usefulness, and if these are exceeded danger may be near.

In the early days of aeronautical engineering welding was often used in places and on parts where to-day it is "taboo," and such a method as welding tube to tube has dropped to a great extent out of favour, having been superseded by the more costly but better and safer engineering practice of jointing by means of machined or built-up tubular sockets, previously referred to.

Welding—by whatever means it is done—is always open to a certain amount of doubt, and though there are innumerable cases where this doubt as to the strength of a joint is well covered, yet, owing to the hidden nature of the defects of welding and

GALLAY
ACHIEVEMENTS

Their excellence and the reasons thereof

1. Our **system of construction** is proved by Government test to be 15 per cent. more efficient than any other type with equivalent water space and air orifice.

2. It is **lighter** per B. Th. U. dissipated than any other type.

3. It is **stronger** and yields less to impact than any other systems and owing to homogeneity of structure it will stand greater stresses vertically, horizontally or frontal.

4. The strength is inherent and not dependent on **tanks** or **casings**. The latter can be entirely dispensed with.

5. Every particle of metal used in construction acts as a **cooling agent.**

6. Each **waterway** is **regular** throughout its length.

7. **Air resistance** is reduced to the **minimum,** no blobs of solder obstruct the air passages, a regular wind cutting edge is always presented.

8. We have **reduced** the **radiator factor** to limits hitherto considered impossible.

9. Our system is suitable for **pump** or **Thermo** syphon.

10. We are Aero engineers and our staff comprise **specialists** in each department.

WE WERE THE PIONEERS
OF
LIGHT, STRONG and EFFICIENT RADIATORS

GALLAY RADIATOR CO., LTD.,

L. T. DELANEY, Managing Director,

198, Great Portland Street, London, W.1.

Telephone—4826 Mayfair. Telegrams—"Galyradico, Wesdo, London."

L.T.D.

the possibility of burning and oxydisation, present-day designers avoid it in any important member of an aircraft structure.

A most important rule introduced during recent years has been the suitable annealing of welded joints, and this rule should be adhered to whenever possible. Many will have noticed the brittleness of a welded joint before annealing or normalising, and the malleability of the same afterwards.

On this point the writers have discovered within the last few months a rather strange fact. We had occasion recently to make up some small lugs in which it was found that a certain amount of shortening took place as the result of the welding on of the arm. We have since noticed this shortening in other tubes, some of quite considerable length, where various fittings have been welded on at intervals, and so far we have not arrived at a satisfactory explanation.

Notes on Welding.

The easiest method of welding is the butt joint, i.e., when two tubes are placed end to end and joined together to form one length or mitred together to form one piece. In such a case the surfaces to be welded are readily accessible, and the flame has freedom for doing its work.

A more difficult type of welding is that necessary when one tube has to be mitred to the outside of another tube, as when forming a "T" lug. In this case the easily-melted end of the one tube has to be united to the outside surface of the other, and anyone who has had experience with welding will know how much more difficult it is to attack the hard outside skin of a tube or sheet than it is the edge.

In order to prove this point we carried out tests on tubes measuring 1 in. outside diameter by 20-gauge and 1 in. outside diameter by 16-gauge—some being butt-welded and others having an interposed tube of about the same diameter, to which the end of each tube was welded.

Comparative tests were made on a cantilever tube joined to the main member by welding, and a similar type of leading was also tested for a lug, with the tube fixed in place by welding.

The following were the results:—Welded direct to tube, 335 lbs.; welded into socket, 365 lbs.

Welding is often harshly criticised as regards its ability to withstand vibration, but even in this respect we have found striking instances where the tube has broken before the joint. [One believes firmly that the speed and quality of the vibration is more important than the heaviness of the blows or the number of blows; also that the tube outside the weld is permanently weakened by the heat of welding.—C. G. G.]

Some time ago we tried an intermittent shock and vibratory test on a machine which gave a series of vibrations to the tube, the blows due to the "peg-cam" being 1,400 per minute. In some cases the tube broke off without the welded joint suffering in any appreciable manner. [But that does not say that the tube was not weakened by the heating and the subsequent contraction of welding.—C. G. G.]

As regards welding of any description to be done on tubing, we do not advocate the use of tubing made from steel too high in carbon. A low carbon steel gives the better result, and it is also most essential that the phosphorus content of both tube and welding wire shall be low.

Wherever possible, we would suggest that the welding on of hinges and sockets to a main spar or post be avoided. To slot a tube, or soften it by welding, is unwise, and in place of any fixtures that at present demand such operations we recommend a sweated and pegged fitting.

In support of this some experiments were carried out by our Company, in order to convince some of our friends of the advisability of following the course we have suggested. In one case a wiring lug was fixed on a main spar by welding, and in the other by sweating and pegging.

Alternating tests on these tubes gave the following results:—Welded, 5,190 revs.; soldered, 8,800 revs.

Tubular Construction Work.

A number of very interesting illustrations of tubular constructional work with which Accles & Pollock have had to deal during the last few years were then shown.

One showed a large trussed girder as designed for use in experimental airship planes. This girder weighed (complete, as shown) 4¾ lbs., and a load of 5 cwt. at the centre of the 8 ft. span produced a deflection of only ¼ in. A similar girder, weighing 5½ lbs. with a depth of 7¼ ins., buckled and collapsed at a total load in the centre of the beam of 10 cwt., equal to one ton distributed evenly. The distance between supports was 8 ft. 6 ins.

A triangular trussed girder or strut which had not yet been tested had the following characteristics:—Length over all, 9 ft. Side of triangle, 12 ins. Total weight, 9¾ lbs.

Rust Prevention.

Mr. Hackett continued:—One further point remains to be mentioned. It is well known that a long life for any modern aeroplane is not expected. The present necessary wastage in aircraft is such that the question of internal rust and corrosion of the steel work is not of serious moment. [One disagrees, for the good reason that aeroplanes may stand for six months in store before being brought out for use in a sudden emergency when there is no time to examine them in detail.—C. G. G.] The time is coming, however, when such matters will have to be seriously considered. For any post-war machines—especially if designed for general passenger traffic—the question of the length of life of all parts will be one of primary importance.

We have experimented with two or three methods of preserving from rust and corrosion, with fairly satisfactory results, and in the case of airship framework, subject as it is to salt-water influence, we have used with fair success the "Cosletising" process. [Which one has strongly advocated in this paper for years past.—C. G. G.]

For soldered work, such as rudder and fin frames, we have instituted at our works a thorough system of washing and brushing in hot soda water to remove all traces of the "Fluxite" or the flux, and we think this is most essential.

In conclusion, we would say that "the last word" in tubes and tubular structures has not by any means yet been spoken. With the increase in the size of machines, the constant and ever-increasing shortage of seasoned timber, the extended use of machines in future years in hot climates, with all the climatic effects on timber, the "all-steel" machine will undoubtedly soon become a reality and a necessity, and consequently the subject of tubes and tubular construction assumes increasing importance.

MR. HOLT THOMAS ON AERIAL TRANSPORT.

According to the "Times" newspaper, the possibilities of flying in the winning of the war, and the future of aeronautics in commerce, were discussed by Mr. G. Holt Thomas, managing director of the Aircraft Manufacturing Co., Ltd., in an address at the Savoy on May 3rd, to the American Luncheon Club.

The recent advance on the part of the Germans, he said, could not have taken place if we had had enough aeroplanes. A few hundred aeroplanes had recently held up hundreds of thousands of Germans by machine-guns and bombing. The same thing would have happened in Italy, but it had been forgotten that the aeroplane was a mobile force, or we should have had hundreds of aeroplanes within a few hours bombing and machine-gunning the enemy. If the business men of all countries had grasped what aviation men had grasped since the French manœuvres of 1910, we should have won this war by aeroplanes some time ago.

[But then the Germans would have grasped it first, as their business men are the quickest graspers, and on Mr. Holt Thomas' argument we should have lost the war. Even as it was German military men grasped the idea sooner than those of any other country.—Ed.]

The Germans had already established aerial posts, but only a very small proportion of the air belonged to the Central Powers. If we could settle what our aerial routes would be it would mean that the Germans would never be able to develop routes except by our permission. The Germans had started a service between Berlin and Constantinople

It was said that the aeroplane was not a commercial proposition because it could not carry a motor-car. It could carry weights greater than a motor-car. The claims for the general commercial use of aircraft were:—(1) It was faster than any other form of transport; (2) it was quite reliable enough to-day, and would get much more reliable as engines improved; and (3) it was not too costly to make it a commercial proposition.

From London to Berlin the fastest route was 20½ hours; by aeroplane it was 7½ hours. To Constantinople the fastest route was 72 hours, but with an aeroplane travelling only 80 miles an hour they could get there in 20 hours. Petrograd was 50 hours away by the fastest route, and an aeroplane would take only 18 hours. There was no place on earth farther than five days from London at 80 miles an hour. He did not suggest that one machine would fly from London to Melbourne, but routes could be established.

We had to look upon a commercial system of aeroplanes as a series of stages, with changing machines and pilots. Melbourne was 5 days from London at 80 miles an hour. Tokio 4½ days; New York, 2 days by the longest route, via the Azores; Buenos Aires, 2½ days; Ceylon, 2¾ days; and Cape Town, 3 days.

Taking the cost of running an aeroplane with two engines and carrying a good load at 5s. per mile between London and Paris, the cost of the carrying of mails worked out at one-third of a penny per ounce, and if they charged a halfpenny an ounce they would make a good profit. They could carry passengers to Paris at £5 a head, to Marseilles at £10 per head, and to Constantinople at £25. He was talking about full loads all the time.

The post to Paris would, of course, be a special service at a special rate. Mails could be looked upon as absolutely commercial, and he thought passengers, too, but there might be occasions when they would get dipped in the Atlantic. In attempting an aerial service across the Atlantic he thought there ought to be ships every hundred miles or so, simply because it was a commercial proposition, and in order not to lose the mails. If there was an accident the mails could easily be picked up.


FOR OBSERVATION PANELS
FOR WINDSCREENS
FOR GOGGLES
FOR MAP COVERS
NOTHING EQUALS:—
'TRIPLEX' SAFETY GLASS
"Triplex" gives 100% visibility, and is absolutely safe; cannot 'fly' or splinter. It has been the means of saving the sight of numerous pilots and observers.
The "TRIPLEX" SAFETY GLASS Co., Ltd.
(Reginald Delpech, Managing Director),
1, Albemarle St., Piccadilly, London, W.1.
Telephone—Regent 1340.
Telegrams—"Shatterlys, Piccy, London."
W.

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—VI.

BY C. SYLVESTER.

Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Crank-shafts.

The methods adopted for obtaining the twisting and bending moment of crank-shafts, and determining the quantity of material necessary for their construction, may be briefly described as follows:—

The stroke and speed of the engine is the first consideration, in order that the acceleration of the piston and its inertia forces may be calculated.

A diagram should then be drawn showing the total pressure on the piston, from which a corrected diagram showing the crank effort for one cylinder may be obtained.

From this the twisting moment for one cylinder, and subsequently the whole of the cylinders, is determined according to the crank angle for each cylinder.

Thus, the maximum twisting moment to which the shaft is subjected being known, it only remains to consider the quality of the material from which it is proposed to construct the shaft, to arrive at the necessary thickness of the webs and journals.

Transmission of Power.

It is the practice in all types of engines to design the crank-shaft of equal size throughout. That is, the size of the journals and the thickness of the webs of one crank is the same as those of another.

Although this is the practice, it must not be taken for granted that the power transmitted is equal at all portions of the shaft. This is not so, because the only portion of the shaft which is transmitting the whole of the power of the engine is the portion between the load and the nearest cylinder.

Passing from the nearest cylinder to the end cylinder, the power transmitted is decreased as each cylinder is passed. When the end cylinder is reached the pressure on that portion of the shaft is equal to the power developed by one cylinder only.

From this it would appear that a gradual reduction in the size of the shaft would be practical. This may be so, and a saving of weight and material might be effected, but the additional cost of labour and the inconvenience in having to provide various-sized bearings would offset any advantage gained in this direction.

Aero-engine Crank-shafts.

Crank-shafts for aero-engines are machined from forgings of the highest grade chrome nickel steel, heat-treated to obtain the best properties of the material.

They are bored hollow throughout, sufficient material being left to ensure a maximum strength with a minimum weight. They are perfectly balanced on knife edges to minimise the whip of the shaft, and the surplus material is removed from the most convenient portion of the shaft in order that the mechanical strength may not be affected.

Crank-shaft Bearings.

The design and construction of crank-shaft bearings vary in different types of engines. For engines up to 140 b.h.p. roller bearings are favoured. Above this power gunmetal bearings, with a lining of Babbit's metal, are sometimes used.

Where this type of bearing is adopted the method of fixing it in its housing is by means of dowel pins. One pin at the top and another at the bottom will keep the bearing in position.

Crank-shaft Thrust Bearings.

These are built up of rollers and balls, the rollers taking the vertical thrust and the balls the lateral thrust. The balls run between discs of hardened steel, the thrust being taken by a flange turned on the shaft from the solid material.

Cam-shafts.

Cam-shafts for aero-engines may be made of mild steel, providing that the cams are made of cast steel and are separately fitted. When this method is used, considerable care should be taken in the cam fitting.

Cams and shafts turned from solid chrome nickel steel are very satisfactory, the cams being more accurately ground to correct shape and finish.

It is not good practice to work any auxiliary apparatus from a cam-shaft, as this will react very unfavourably upon the timing of the valves.

Sufficient bearings should be fitted to prevent any deflection of the shaft as the valve springs are depressed.

Cam Design.

One of the chief features of cam design is that it should open a valve and allow it to close without shock. That is, there should be no blow between the cam and the valve or valve tappet on opening, or between the valve and its seat on closing.

To obtain this condition, the point of contact should be tangential to the cam circle, yet sufficient clearance should be permitted to allow for the expansion of the shaft and cam, after it is ascertained that the valve is resting on its seat.

In aero-engine construction it may be said that cams are divided into two classes:—

1. Cams which will open a valve a predetermined distance, then allow it to close.
2. Cams which will open a valve, maintain it open for a predetermined period, then allow it to close.

These types are illustrated in Fig. 17 A and B respectively. To design the cam A, it is first necessary to determine the period of time the valve will be open. As an example we will presume that the valve is open for a period of 90 degrees. Then, if the valve lift is, say, half an inch, the cam may be constructed as shown in Fig. 18.

When dealing with a cam of the type illustrated in Fig. 17 B, we have a much different proposition.

Here we will again presume that the cam is open for 90 degrees, but of this period it is to be maintained open at its maximum point for 20 degrees. The type of cam and the method of arriving at its design is shown in Fig. 19.

In the above diagrams we have ignored clearances altogether, but it is most essential that allowances should be made for them. To do so it is necessary to add the clearance to the height of the cam.

The angle between the centres of the inlet and exhaust cams depends upon the predetermined point, in degrees, of the opening of the valves.

Valves.

All valves used in aero-engine construction should be made of

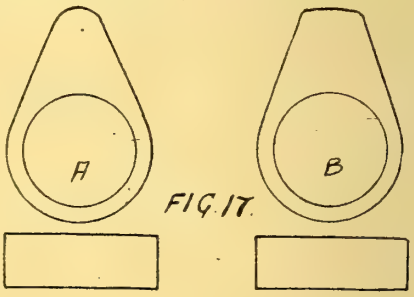


FIG. 17.

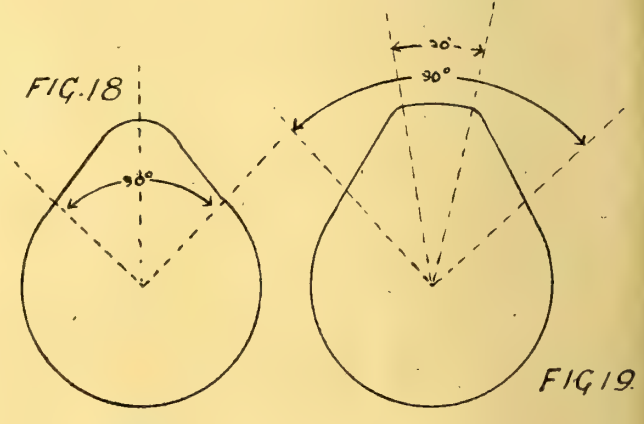
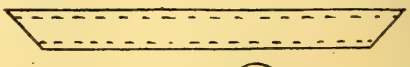


FIG. 18

FIG. 19


FIG. 20

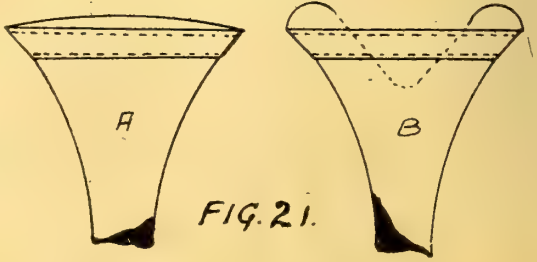
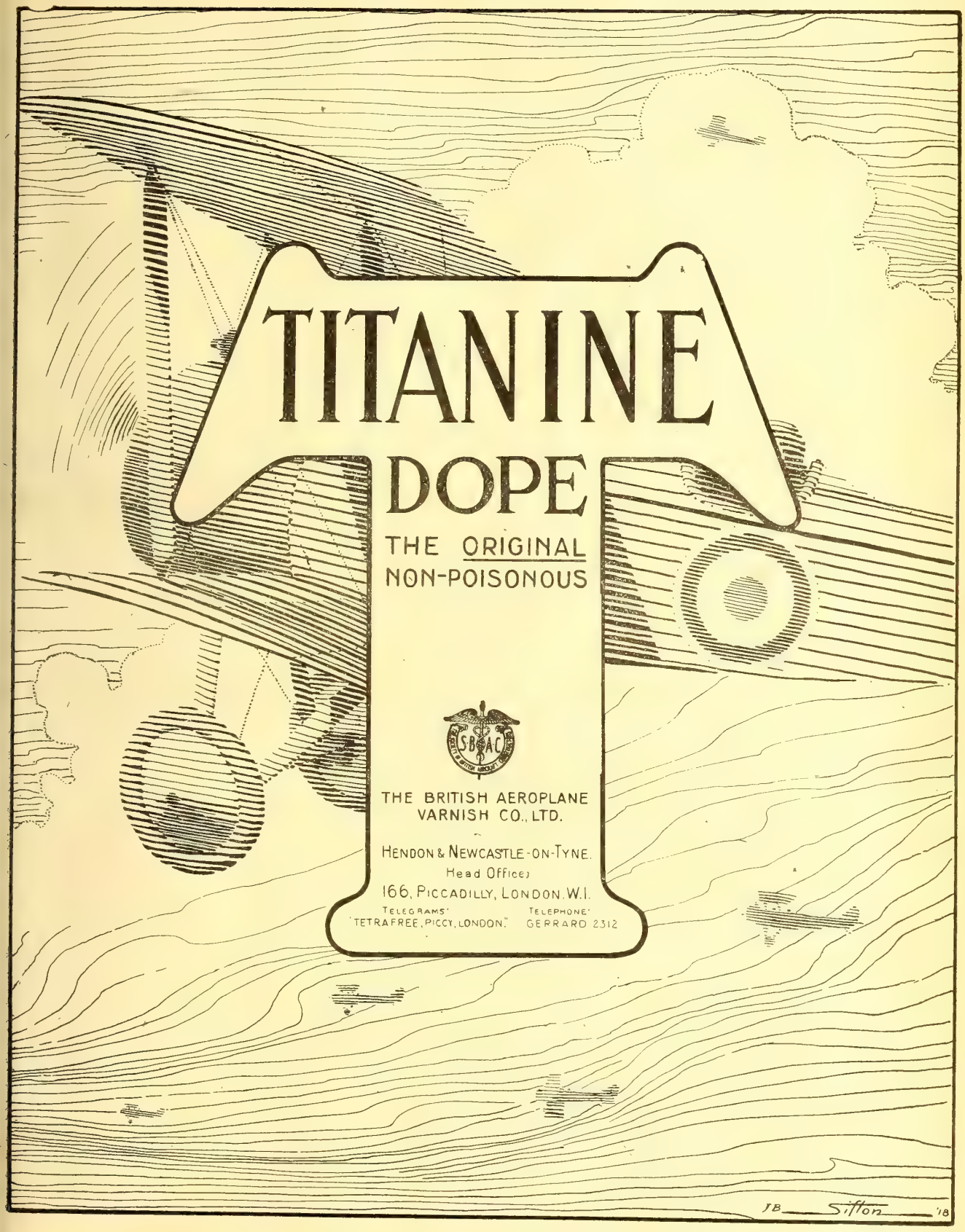


FIG. 21.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office)
166, PICCADILLY, LONDON. W.1.
TELEGRAMS:
"TETRAFREE, PICCY, LONDON."
TELEPHONE:
GERRARD 2312
J.B. Sifton '18

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office

27, BUCKINGHAM GATE, S.W.1.

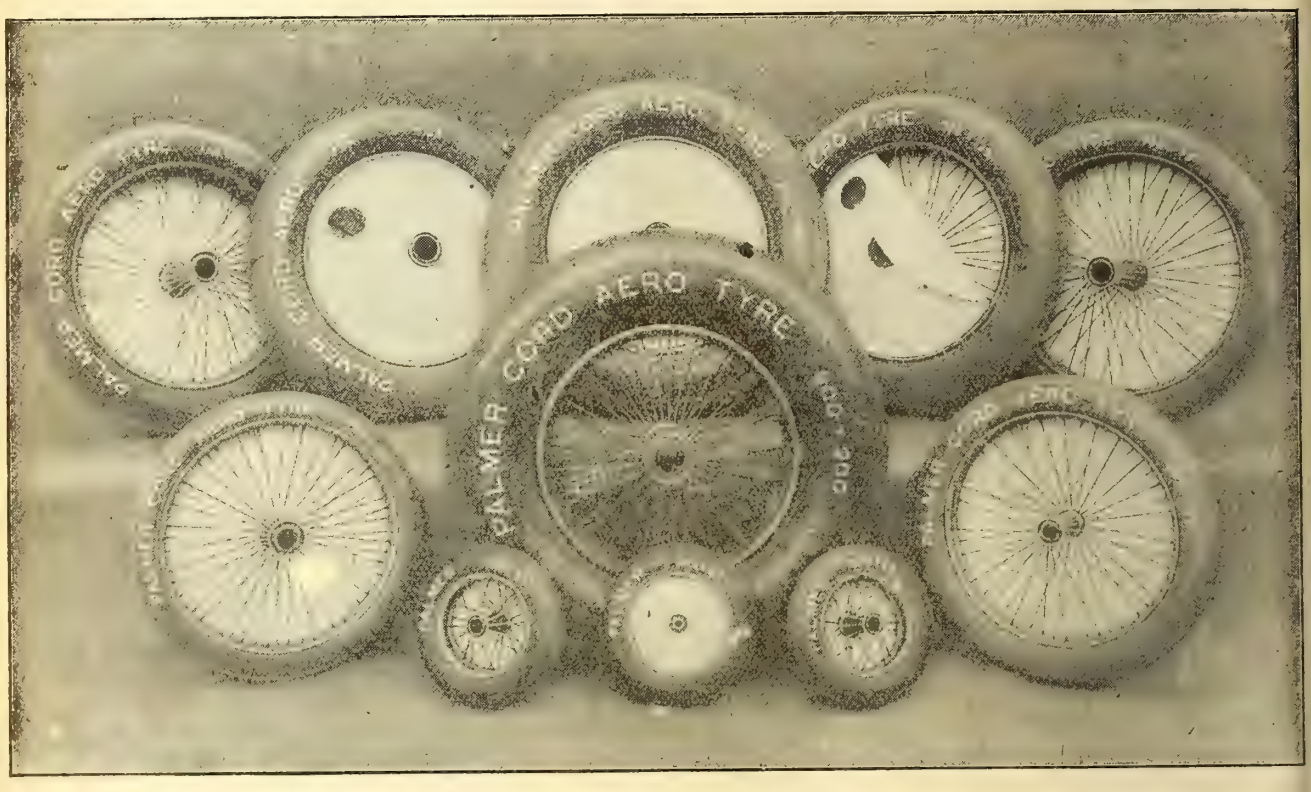
Offices, etc.

HENDON, N.W.9.


The
SELSDON
Aero & Engineering
Co, Ltd.
Albemarle St W1
Telephones
REGENT 1181
CROYDON 1761
Specialists in
TANKS
and
TANK FITTINGS
for
DE H. MACHINES

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×100	33	150.	38.09	Central	800×150	†41	185.	55.	Central
,,	17	72.39	12.7	Central	,,	77	178.	44.45	132/46	,,	82	185.	55.	135/50
450×60	30	89.	31.75	Central	,,	92	185.	55.	135/50	,,	85	185.	55.	Central
575×60	21	160.	28.	Central	,,	95	185.	55.	Central	,,	106	185.	47.62	135/50
,,	34	150.	31.75	104/46	,,	96	178.	55.	132/46	,,	†205	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	99	178.	38.89	132/46	1000×150	97	250.	65.4	Central
650×65	78	178.	44.45	132/46	,,	112	150.	40.	Central	,,	102	185.	55.	125/60
,,	79	178.	44.45	Central	650×125	119	178.	55.	132/46	,,	201	185.	60.32	125/60
,,	100	178.	38.09	132/46	750×125	33	150.	38.09	Central	900×200	107	185.	55.	Central
,,	101	178.	31.75	132/46	,,	77	178.	44.45	132/46	,,	108	185.	55.	125/60
600×75	21	160.	28.	Central	,,	92	185.	55.	135/50	,,	120	185.	66.67	125/60
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	208	185.	60.32	125/60
700×75	78	178.	44.45	132/46	,,	99	178.	38.89	132/46	1100×200	52	185.	55.	116/69
,,	79	178.	44.45	Central	,,	112	150.	40.	Central	,,	57	185.	55.	Central
,,	100	178.	38.09	132/46	800×150	†36	185.	55.	135/50	,,	203	185.	60.32	116/69
,,	101	178.	31.75	132/46	,,	†40	185.	60.32	135/50	,,	204	185.	60.32	Central

†*Wheels Nos.* 36, 40 41, *and* 205 *are of stronger type than the other wheels for* 800 x 150 *tyres.*

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

SUNBEAM-COATALEN AIRCRAFT MOTORS

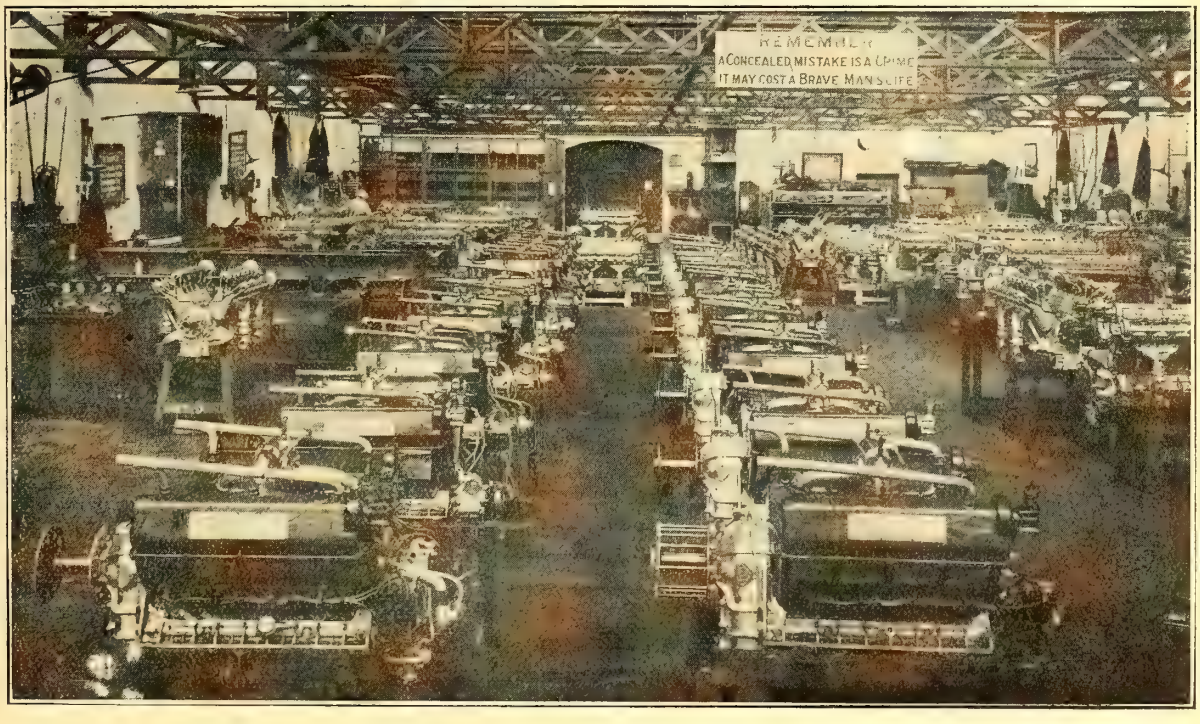
No firm has shown more energy and enterprise in aerial engine production than the Sunbeam Motor Car Company. They work ceaselessly to achieve further improvements, with the result that the fame of the Sunbeam-Coatalen goes on increasing.

As an example of the high repute in which these engines stand, it might be pointed out that Sunbeam-Coatalen motors can be found on the famous Handley-Page aeroplanes. These giant bombing machines are amongst the greatest triumphs of British aircraft engineering. It need hardly be said that only the finest and most reliable engines could be associated with these powerful bombing machines Sunbeam-Coatalen engines, in fact, have given splendid service in every branch of aerial work.

National pride can be taken in the fine achievements of the British motor industry during the war, and the record of the Sunbeam Motor Company stands out as a bright example of progressiveness and success. As long as we have firms of this calibre, we may feel confident that in war or in peace we can hold our own against any opponent.

Mr. R. P. Hearn in "The Tatler," May, 1st, 1918.

The SUNBEAM MOTOR CAR Co., Ltd., Wolverhampton.



THE AEROPLANE
COMPONENT FIRM
for STEEL TUBING and PRESSWORK PARTS.

We make Fins, Elevators, Rudders, Axles, Gun-mountings, Levers, Clips, Wiring Ferrules, etc.

We manufacture Tubing in Carbon, Nickel, and Chrome Nickel Steels.

When you have problems to solve, send details for our assistance.

Telegrams: "Accles, Oldbury." Code: A.B.C., 5th Edition.

ACCLES & POLLOCK, LIMITED

OLDBURY, BIRMINGHAM.

Telephone: Oldbury, 111. (4 lines).

THE
GRAHAME-WHITE
AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Telegrams: VOLPLANE, HYDE, LONDON.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telephone: Kingsbury 120 (5 lines).

W. CANNING & Co. Gt. Hampton Street.

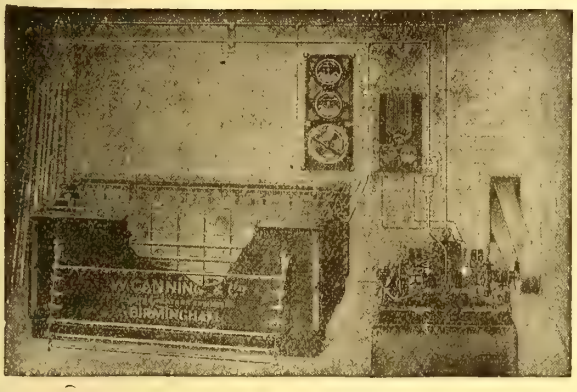
And 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

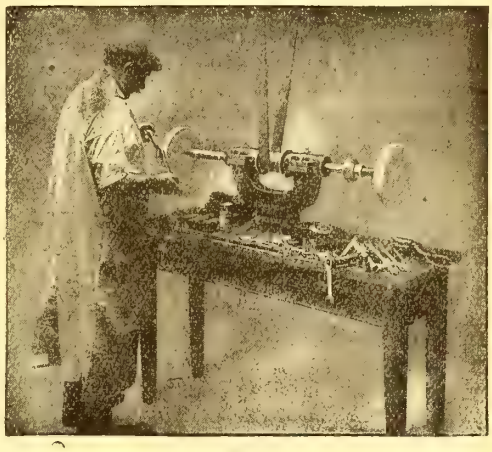


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

LANGTON ROAD, CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON



The · Aeroplane ·

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1902 (3 lines).

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London. Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420.

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 912.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Martinsyde Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193.

Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 1088 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes" Cowes 3

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton Wimbledon 1314.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand and Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings— Avenue 995, 996, and 7006.

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61.

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4679

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico, London, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1 Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, I., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4040

The British Emaijite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg. London." Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085.

The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevenfold, London" Walthamstow 408 (2 lines).

Electrical Accessories—

Belling & Co., Montague Road, Upper Edmonton, N.18. "Belling, Edmonton Tottenham 19

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 15

Mann, Egerton & Co., Ltd., 177, Clevela Street, London, W.1. "Installing, E road, London." Museum

Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. "Fe renheit, Birmingham." Midland

The Rotax Motor Accessories Co., Ltd., V toria Road, Willesden Junction, N.W. "Rodynalite, Phone, London." Willesden 24

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry 24

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 15

Electric Lighting and Power—

E. Stanley Fardon, A.M.I.E.E., 67, Mosley Street, Manchester

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London." Central 2207, London Wall 15

Electro Platers and Metal Polishers' Engineers—

W. Canning & Co., 133-137, Great Hampton Street, Birmingham. "Materials, Birmingham." Birmingham 3622 Central (3 line

Enamel—

Silico Enamel Co., New Cross, London, S.

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London 3540 Victoria (3 line

Flexible Shafts—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth. "Etches, Winton." Bournemouth 11

Cambridge School of Flying and Aerodrome Co., 308, St. Andrews St., Cambridge. "Cabon, Cambridge." Cambridge 5 and 10

Furniture (Office) —

Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2. London Wall 573 and 617

Galvanising—

Boulton & Paul, Ltd., Rose Lane, Norwich "Aviation, Norwich." Norwich 85

Gauges—

J. A. Prestwich & Co., Northumberland Par Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston Birmingham. "Mosgear, Birmingham." East 4

Glue—

Cannon, B., & Co., Ltd., Lincoln. London Office, 110, Cannon Street, E.C. "Bececolin, Cannon, London." City 12

Improved Liquid Glues Co., Ltd., Gt. Hermitage Street, E. (Croid.). "Excroide Wapp, London." Avenue 31

Mendine Co., 8, Arthur Street, E.C. Bank 58

Oldroyd, Wm., & Sons, Ltd., 9, Mincing La E.C

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Picc London." Regent 14

Hack Saw Blades and Machines—

Victor Saw Works, Ltd., 2 and 3, Wo Street, Finsbury Circus, London, E. Vicsaw, Phone, London." London Wall 18

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 6 Southwark Street, London, S.E.1. "Kinne London" Hop 372 (2 line

Sturtevant Engineering Co., Ltd., 147, Que Victoria Street, London, E.C.4. "Sturtevant, London." Central 7121 (6 line

Hollow Spars—

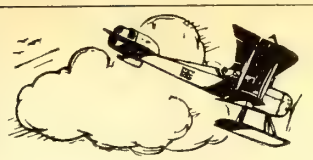
McGruer Bentwood Hollow Spar Co., Commercial Wharf, Lambeth, S.E. "Gabrielson, Watloo, London." Hop 7

Robert Young's Construction Co., Ltd., Canbury Street, Essex Road, London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2. Holborn 13

Buyers' · Guide.



ıments (Scientific, Alti-
ɛters, etc.)—
Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge" Cambridge 642.
& Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

eto Driving Pieces—
ert Terry & Sons, Ltd., Redditch. Springs, Redditch." Redditch 61

etos—
M-L Magneto Syndicate, Ltd., Coventry. Corlton, Coventry." Coventry 1008-1009.
British Lighting & Ignition Co., Ltd., 24, Tottenham Court Road, W.1. "Vicks-ng, Phone, London." Museum 430
British Thomson-Houston Co., Ltd., Lower ord Street, Coventry. "Asteroidal, Coven-y." Coventry 278.

Manufacturers—
d. Chas., & Sons, Ltd., Birmingham. Clifford, Birmingham." Central 42-43.

s in General— Avenue 1432
ie, J. B., & Son, 30, St. Mary Axe, E.C.3.
& Co., 46, Fenchurch Street, London, C.3. "Poetry, Fen, London." Avenue 005, 006, and 7006
el Mercer & Co., 198, Upper Thames reet, E.C.4. "Reconciled, Cannon, ondon" City 6342.

Parts and Fittings—
& Pollock, Ltd., Oldbury, Birmingham. Accles, Oldbury." Oldbury 111 (3 lines).
plane General Sundries, Ltd., Fulwood louse, Fulwood Place, High Holborn, W.C. "Zeppiskout, Holborn, London." Holborn 4959.
ft Supplies Co., Ltd., Ascot House, 125, ong Acre, W.C.2 Upcast, Rand, ondon" Gerrard 276 (2 lines)
t & Harrison, Ltd., Hythe Road, Willes-en Junction Willesden 2207.
s. Jones & Bayliss, Ltd., Wolverhampton. Bolts and Nuts.) "Bayliss, Wolverhamp-n." Wolverhampton 1041.
burn Aeroplane & Motor Co., Ltd., lympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
h Metal (Kingston), Ltd., Kingston-on hames
ie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
ard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).
. Egerton & Co., Ltd., 177, Cleveland treet, London, W.1. "Installing, Eus-ad, London." Museum 70.
tford, Fredk., Lt., Lifford, Birmingham, Fremo, Birmingham." King's Norton 261.
tson, J. H., & Co., 1, Albemarle Street, ondon, W.1 Regent 3006.
y, Owen, & Co., Darlaston South Staffs.
s. Joseph, & Sons, Ltd., Wellington hropshire. "Sankey, Wellington, Salop." Wellington 76
Pulvo Engineering Co., Ltd., 10 to 16, lane Street, High Holborn, London, W.C.1. Pulvipult, Phone, London." Holborn 410.
Selsdon Aero & Engineering Co., Ltd., Albemarle Street, Piccadilly, W.1. Selaero, Phone, London." Regent 1181.
Rotax Motor Accessories Co., Ltd., Vic-oria Road, Willesden Junction, N.W.10. Rodynalite, Phone, London." Willesden 2480.
ıson Bros., Ltd., Bradley, Bilston. Thompson Bros., Bilston." Bilston 10.
er Engineering Co., Ltd., Old Oak Com-non Lane, Willesden Junction, N.W.10.

l Shearing Tools—
gomery, Smith & Co., Ltd., Keynsham, ear Bristol. "Ingenuity, Saltford." Keynsham 21.

l Spinning—
ld & Sons, Lawrence Road, Tottenham, N.15.

c Bolts—
more Bros., Hildreth Street, Balham, S.W. Battersea 415.
ry Owen & Co., Darlaston, South Staffs.

ellaneous—
rson, D., & Son, Ltd. (Roofs), Belfast. Anderson, Belfast." Belfast 4033-4034-4035.
den Wire, Ltd., Willesden Junction, Bowirelim, Harles, London." Willesden 2400 (3 lines).
sh Metal (Kingston), Ltd., Kingston-on-Thames.
n Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.
ert Wood Co., Ltd., Chapel-en-le-Frith. Frodobrake, Birmingham." Central 793.
Lennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115

Motor Cars—
Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282.
Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Eus-road, London." Museum 70.
Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—
British Metal (Kingston), Ltd., Kingston-on-Thames.
The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing."

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—
E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemaiivo, Ave, London" London Wall 3266-3267.

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—
British Chuck & Piston Ring Co., Coventry. "Rings, Coventry" Coventry 723
The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—
Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.
Integral Propeller Co., Ltd. "Avilprop, Hyde, London." Hendon 9, Kingsbury 104.
Lang Propeller, Ltd., Weybridge. "Aerosticks Weybridge" Weybridge 520-521.
Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)
Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.
Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—
The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26.

Radiators—
Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Galyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—
Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—
Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217
Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.
Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.
Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—
Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Shackles—
British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).
Arnold & Sons, Lawrence Road, Tottenham, N.15.
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk Bham." Central 550.
British Metal (Kingston), Ltd., Kingston-on-Thames.
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Arnold & Sons, Lawrence Road, Tottenham, N.15.
British Metal (Kingston), Ltd., Kingston-on-Thames
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.
Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Small Tools—
The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 245.
Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—
Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.
Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—
Avenue 1432.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.
Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—
Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.
Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Nicklin, Bernard, & Co., Birmingham. "Bernard, Birmingham." Smithwick 224.

Steel Stamps and Markings—
John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury" Oldbury 111 (3 lines).

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—
Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 1526.
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 4-6.
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.
J. Owen & Sons, Ltd., 100a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The Aeroplane Buyers' Guide.



Acceptance and Experimental Flights—
The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Lidibrac, 'Phone, London" 3540 Victoria (3 lines).

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London" Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol "Aviation, Bristol" Bristol 3308
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2 "Caudronian, Cricklewood, London" Hampstead 5551
Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4434 and 4434
Davisson Aviation Co., Ltd., Hammersmith, W.6. "Davisson, Phone, London" Hammersmith 1092 (3 lines)
Dawson, John, & Co., Ltd., Newcastle-on-Tyne "Dependable Newcastle-on-Tyne" Central 2094 (2 lines)
Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne" Eastbourne 1176
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon "Volplane, Hyde, London" Kingsbury 121
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydroplud, Cricklewood, London" Hampstead 741
Hooper & Co., Ltd., 54, St. James's Street, Piccadilly, London, S.W. "Sociable St. James, London" Regent 1611
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet "Martinsyde, Weybridge" Weybridge 331 Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston Museum 3373
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2 "Nieuxport, Crickle, London" Willesden 2455
Norman Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 38
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6 "Carbodis, London" Putney 2240-2241
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester" City 8530-8531, Manchester
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consaun, East Cowes" Cowes 193
Short Bros., Rochester, Eastchurch and Wheatley House, S.W. "Tested 'Phone, London" Regent 378
Sopwith Aviation Co., Ltd., Kingston on Thames "Sopwith, Kingston." Kingston 1088 (8 lines)
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.
Vickers, Ltd., Caxton Court, Caxton Street, Westminster, S.W. "Vickersltd, Knights, London" Kensington 6800
Wong & Gillon, Ltd., Hammersmith "Wongill Ox, London" Museum 5000
Westland Aircraft Works, Yeovil "Aircraft Yeovil" Yeovil 120
White & Samuel & Co., Ltd., Pier, Cowes "White, Pier, Cowes" Cowes
Whitehead Aircraft (1918), Ltd., Richmond, Surrey "Whitecraft, Richmond, Surrey" Richmond 780
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84

Airships—
Airships, Ltd., High Street, Merton Wimbledon 1324.
Short Bros., Rochester, Eastchurch and White hall House, S.W. "Tested 'Phone, London" Regent 378

Aluminium Castings (Sand and Die)
Coan, R. W., 210, Goswell Road, London, E.C.1. "Krimcases, Isling, London" City 2846

Bent Timber Parts—
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euston, London." Museum 496
Also at Market Harborough, Leicestershire "Hoptons, Market Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds" Central 3927.

Blowpipes (Oxy-Acetylene)—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

Brass Sheets for Tipping Propellers—
Pratt & Co., 46, Fenchurch Street, London, E.C.3 "Poetry, Fen, London"

Buildings—
Avenue 095, 096 and 7000
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich" Norwich 851
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery, Owen & Co., Darlaston, South Staffs.
The Wolfley Co., Ltd., Salisbury House, London Wall, E.C.2 "Wrathless, Phone, London." City 2081-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070

Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3 "Surieco, London, Fen Avenue 34 and 35

Celluloid (Non-Flam.)—
Greenhill & Sons, 8 Water Lane, E.C. "Greenharg, London." Central 1306-7

Clothing—
Burberrys, Ltd., Haymarket, S.W.1 Regent 2165
Dimmock, Ltd., Euston Road, N.W.1. "Dunsend, London" Museum 3405 6

Coloured Rags
Joseph A. Fair Street, London Road, Southwark, S.E.1 "New Mongo Sedist, London." Hop 83, 361, 4272

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)
Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4434 and 4434
PDV Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond" Richmond 1681
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England "Thompson Bros, Bilston" Bilston 10

Cords, Tapes, and Threads—
MacLennan, J., & Co., 30, Newgate Street, E.C.1 And at Glasgow. City 3115

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1 "Petrolfree, Piccy, London." Gerrard, 2312
British Cellulose Co., 8, Waterloo Place, S.W.1 "Cellulose, London" Regent 4046
The British Enamine Co., Ltd., 30, Regent Street, S.W.1 "Railrepsen, Piccy, London" Gerrard 280
Ceilon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg, London" Gerrard 440.
Clark, Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2 "Parkin, Westrand, London" Regent 3923

Engines and Parts—
Allen, W. H., & Co., Ltd., Bedford "Pump, Bedford" Bedford No. 1
Arrol-Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-282
The Beaver School of Flying, Ltd., The Broad Walk, Cricklewood, N.W.2 Hampstead 4900
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 258
Dudbridge Iron Works, Ltd. (Sahnson), 87, Victoria Street, London, S.W.1 "Aero Night, Vic, London" Vic 7026
Gordon Watney & Co., Ltd., Weybridge "Mercedes, Weybridge" Weybridge 550 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1193
Gwynnes, Ltd., Hammersmith, W. "Gwynne, Hammersmith" Hammersmith 1010
Napier & Son, Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Napier, London" Gerrard 8026.
Rolls-Royce, Ltd., 12 and 13, Conduit St., W.1 "Rolls, London" Gerrard 1634 5-6
Sanderson & Co., Ltd., Wolverhampton "Monfield, Wolverhampton" Wolverhampton 085
The Gnôme & Le Rhône Engine Co., Ltd., 2, Victoria Street, S.W. "Elevenfold, London" Walthamstow 308 (2 lines)

Electrical Accessories—
Belling & Co., Montague Road, Upper Edmonton, N.18 "Belling, Edmonton"
Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Central 2207, London W.
Mann, Egerton & Co., Ltd., 127, Victoria Street, London, W.1 "Instacon, London"
Premier Electric Heaters, Ltd., 258/260, Bradford Street, Birmingham "Premheat, Birmingham" Midland 180
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxmate, Phone, London"
Electric Cables—
E. Kalker & Co., Coventry "Kalker, Coventry"
Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London" Central 2207, London W.

Electric Lighting and Power—
E. Stanley Edwards (M.I.E.E.), 67, St. Vincent Street, Manchester
Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Central 2207, London W.

Electro Platers and Metal Polishers' Engineers—
W. Canning & Co., 133-137, Great Hampton Street, Birmingham. "Mister, Birmingham" Birmingham 3622 Central 13

Enamel—
Silico Enamel Co., New Cross, London, S.E.

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Lidibrac, 'Phone, London" 3540 Victoria

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Flying Schools—
Bournemouth Aviation Co., Ltd., The Pier, Bournemouth "Pilches, Bournemouth"
Cambridge School of Flying and Aeroplane Co., 308, St. Andrews St., Cambridge "Aeronbon, Cambridge" Cambridge 5

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury Pavement House, London. E.C. London Wall 573 and 5

Galvanising—
Boulton & Paul, Ltd., Rose Lane, Norwich "Aviation, Norwich" Norwich

Gauges—
J. A. Prestwich & Co., Northumberland Park, Tottenham, N.17.

Gears—
Moss Gear Co., Ltd., Thomas Street, Aston, Birmingham "Musgear, Birmingham"

Glue—
Cannon, B., & Co., Ltd., Lincoln's Inn House, Office, 110, Cannon Street, E.C. "Beecealin, Cannon, London" City 6
Improved Liquid Glues Co., Ltd., 61, Fore Street, E.C. (Cloud's Glue) "Impglues, London" Avenue
Wipp, London
Meadows Co., 8, Arthur Street, E.C. Bridge
Meadows Co., 8, Arthur Street, E.C. Bridge
Oldroyd, Wm., & Sons, Ltd., 9, Manor Row, Bradford

Goggles—
Triplex Safety Glass Co., Ltd., 14 & 15, Conduit Street, Piccadilly, W.1 "Sheltering, London" Regent

Hack Saw Blades and Machines—
Victor Saw Works, Ltd., 2, Carpenter Street, Finsbury Circus, London, E.C. "Victosaw, Phone, London" London Wall

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., 65, 68, & 69, Southwark Street, London, S.E.1 "Kinnell, London"
Sturtevant Engineering Co., Ltd., 5, Great Victoria Street, London, E.C.2 "Blowant, London" Central 2121

Hollow Spars—
McGruer, Barnwood Hollow Spar Co., 3, Commercial Wharf, Lampeth, S.E. "Barnwood, London"
Robert Young & Co., Ltd., Wolverhampton "Monfield, Wolverhampton" Wolverhampton 085

Instruments—
British Wright Co., Ltd., 53, Chancery Lane, W.C.2

ruments (Scientific, Alti-
[illegible], etc.)—
[illegible] Scientific Instrument Co., Ltd., [illegible] "Instrument, Cambridge" Cambridge 042
[illegible] & Mason, Ltd., Manchester Road, [illegible] "Aneroid Phone, [illegible] Wilmslow 180

neto Driving Pieces—
[illegible] Tool & Stud, Ltd., Redditch [illegible] Redditch 61

nets—
[illegible] Magneto Syndicate, Ltd., Coventry. [illegible] "Coventry 1008-1009
[illegible] Coventry
[illegible] Bros. & Ignition Co., Ltd., [illegible] Court Road, W.1 "Nicks [illegible] Museum 430
[illegible] & Thomson Houston Co., Ltd., Lower [illegible] "Instrondall, Coventry" Coventry 278.

l Manufacturers—
[illegible] & Son, Ltd., Birmingham [illegible] Central 4245

uils in General—
[illegible] Avenue 1432
[illegible], J. B., & Son, 30, St. Mary Axe, E.C.3 [illegible] & Co., 46, Lombard Street, London, E.C. [illegible] "Reconciled, London"
[illegible] Mercer & Co., 108, Upper Thames Street, E.C.4. "Reconciled, Cannon, London" City 6342

l Parts and Fittings—
[illegible] & Oak, Ltd., Oldbury, Birmingham [illegible] & Bolt, Oldbury." Oldbury 111 (3 lines)
[illegible] General Sunrises, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppiskol, Holborn, London" Holborn 4050.
[illegible] Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 Upcast, Rand, London" Gerrard 276 (2 lines)
[illegible] & Wilson, Ltd., Hyde Road, Willesden [illegible] Willesden 2205
[illegible] & Barnes, Ltd., Wolverhampton [illegible] and Nuts)" "Barnes, Wolverhampton" Wolverhampton 0431.
[illegible] Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
[illegible] Motor (Kingston), Ltd., Kingston-on-Thames
[illegible] J. B., & Son, 30, St. Mary Axe, E.C.3.
[illegible] Rim and Tube Co., Lombard Street, Birmingham "Lombardic, Birmingham" Midland 211 (2 lines).
[illegible] Egerton & Co., Ltd., 127, Victoria Street, London, W.1 "Instalting, Euston" Museum 70.
[illegible] Frodsham, Ltd., Clifford, Birmingham. "Frodsham, Birmingham" King's Norton 261.
[illegible] Hall & Co., 8, Albemarle Street, London, W.1 Regent 3006
[illegible] Owen & Co., Darlaston, South Staffs. [illegible] Ltd., Wellington "Sankes, Wellington, Salop" Wellington 37
[illegible] Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. [illegible] Phone, London" Holborn 310
[illegible] & Engineering Co., Ltd., 8, Albemarle Street, Piccadilly, W.1. [illegible], Phone, London" Regent 1781.
[illegible] Wood Co., Ltd., Victoria Road, Willesden, N.W.10 "Lebeolite, Phone, London" Willesden 2480.
[illegible] Ltd., Baltic Buildings, Thompson Bros., Wilson" Baltic, London
[illegible] Engineering Co., Ltd., Old Oak Common, Wood Lane, N.W.10

al Shearing Tools—
[illegible] & Co., Ltd., Keynsham, [illegible] "Ingenuity, Stifford" Keynsham 21

l Spinnings—
[illegible] & Son, Lawrence Road, Tottenham, [illegible]

ic Bolts—
[illegible] Bros., Hildreth Street, Balham, [illegible] Battersea 345.

ellaneous—
[illegible] & Son, Ltd. (Roofers), Belfast [illegible] "Belfast" Belfast 2033 4034 4035
[illegible] Wire, Ltd., Willesden Junction, [illegible] Harlesden, London"
[illegible] Metal (Kingston), Ltd., Kingston-on-[illegible] Wells 800 2200 (2 lines)
[illegible] Bros., Ltd., Great Eastern Street, [illegible] "Unbrowned, Bethnal, London" London Wall 6300.
[illegible] Wood Co., Ltd., Chapel-en-le-Frith, [illegible]shire, Birmingham" Central 703.
[illegible] & Co., 30, Newgate Street, [illegible] and at Glasgow. Tapes, Cords and [illegible] City 3115

Motor Cars—
Arrol Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281 282
Mann, Egerton & Co., Ltd., 372, 374, Euston Road, London, N.W.1. "Manegear, Euston road, London" Museum 70
Standard Motor Car Co., Coventry "Ulysses, Coventry" Coventry 230 (4 lines)

Nameplates and Labels—
British Metal Mouldings, Ltd., Kingston-on-Thames
The Clegg Metal Engraving Co., Worthing "Clegs, Worthing"

Observation Panels—
Triplex Safety Glass Co., Ltd., 14, Albemarle Street, Piccadilly, W. "Shatterless, Piccy, London" Regent 1340

Parachutes—
London Regent 1340
E. R. Calthrop's Aerial Patents, Ltd., London Street House, Eldon Street, London, E.C. "Savemanso, Ave, London" London Wall 3366 3367

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Paddington 4743

Piston Rings—
British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 753
The Standard Piston Ring and Engine Co., Ltd., Dan Road, St. Bede "Ocean, Sheffield" Sheffield 2149

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—
Bliss, E. W., & Co., 20, Peach Street, Blackfriars Road, London, S.E.1 "Blissdon, London" Hop 4340.

Presswork—
Rubery Owen & Co., Darlaston, South Staffs. Jerrys, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch" Redditch 61

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851
Ebora Propeller Co., 11 & 12, Surbiton Hall Terrace, Kingston-on-Thames "Eborus, Kingston" Kingston 672
Integral Propeller Co., Ltd., "Airprop, Hyde, London" Hendon 4, Kingsbury 104
Lang Propeller, Ltd., Westbridge "Aerosticks, Wevertige" Westbridge, Surrey 521
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich." Norwich 482 (4 lines)
Odds, W. D., & Co., Leeds "Airscrews, Leeds" Central 291, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120

Pyrometers—
The Foster Instrument Co., Letchworth, Herts "Foster Instruments, Letchworth, Letchworth 26

Radiators—
Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1 "Galvradiat, Wesdo, London" Mayfair 4826.

Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England "Cradock Wakefield" Wakefield 466

Rubber Tubing & Accessories—
Hancock, James Tayne, Ltd., 266, Goswell Road, London, E.C.1 "Mancasaur, Islington, London" City 3811 and 3812

Safety Belts—
Holmes, C. H., & Son, 38, Albert Street, Manchester "Semlash, Manchester" City 4432

Screw-driving Machines—
Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 217
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines).
The Norman Thomson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 38
Short Bros., Rochester. "Seaplanes, Rochester" Chatham 627
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—
Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Lidibrac, 'Phone, London" 3540 Victoria (3 lines).
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynamic, Phone, London" Willesden 2480.

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)
Arnold & Sons, Lawrence Road, Tottenham, N.15.
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham "Brisk, Bham" Central 550
British Metal (Kingston), Ltd., Kingston-on-Thames
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. "Lustalgo, Birmingham"
Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Arnold & Sons, Lawrence Road, Tottenham, N.15.
British Metal (Kingston), Ltd., Kingston-on-Thames
Rubery Owen & Co., Darlaston, South Staffs.
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
The Nelson Aircraft Corporation, Ltd., 4, Albemarle Street, Piccadilly, W.1. "Selsero, Phone, London" Regent 1681
Arthur Hill & Co., Sidwester Road, North Kensington, W. Park 1443

Small Tools
The Small Tool Supply Co., Ltd., Avenue Chambers, South Improd Row, W.C. "Prosmit, Westcent, London" Museum 2055

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Ignites, Rugby" Rugby 245
Ripault, Lee & Co., Ltd. (Oleo Pneu), 694, Pollard Street, W.1. "Ripault, Regd, London" Regent 1681
Springs—
Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 321.
Jerry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines)

Stampings—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Arnold & Sons, Lawrence Road, Tottenham, N.15

Steel—
Allen, Edgar, & Co., Ltd., Sheffield "Allen, Sheffield" Sheffield 4607.
Firth, Thos., & Sons, Sheffield "Firth, Steel, Sheffield" Sheffield 3230 to 3237
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432
Sicklin, Bernard & Co., Birmingham "Bernard, Birmingham" Central 224

Steel Stamps and Markings—
John Meerloo & Sons (Key Tag), Ltd., Phone, London" Dephar, Phon, London" First 4331 (2 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Ilford, Birmingham "Fredon, Birmingham" King's Norton 261-262.

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Timber—
Brown, R. F. & F. W., Wolfston, near Northampton Northampton 1526
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euston, London" Museum 496
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough" Market Harborough 13
Mitchell Brothers, 14, Borough High Street, S.E.1. "Bucheron, London" Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3023.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1305.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 05.

Washers—
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Lawrence Road, Tottenham, N.15.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London." Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5010.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

HEATING AND VENTILATION

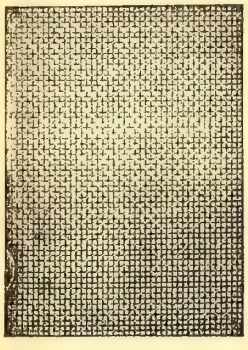
OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

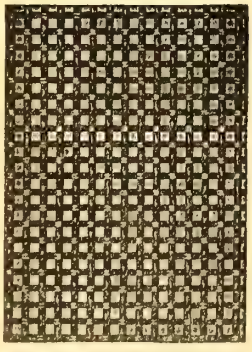
Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. **Wire: "KINNELL-BOROH-LONDON."**

CHAS. P. KINNELL & Co., LTD., SOUTHWARK ST., LONDON, S.E.1





AIR BOARD STANDARD PETROL GAUZE—CONTROLLED BY THE AIR BOARD.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY

N. GREENING & SONS, LTD. ESTABLISHED 1790.

LONDON WAREHOUSE—

16 FINSBURY STREET, E.C.2.

Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No.—LONDON WALL 1082.

WARRINGTON.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

ENGINEERING EMPLOYERS' FEDERATION 1896

Telegrams
JONAS,
SHEFFIELD.

REGISTERED I C N V TRADE MARKS.

Telephone
No. 4660.
PRIVATE BRANCH EXCHANGE.

S.B.A.C. SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. — **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. — **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. — **A HIGH GRADE ALLOY CASE HARDENING STEEL**
For severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

SHEFFIELD.

HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

FINE SAW MILLS, WORKS, ETC.

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

INCREASED OUTPUT
DEMANDS
GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

The Wilfley Company, Limited

SALISBURY HOUSE, LONDON WALL, E.C. 2.

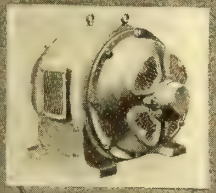
Telegrams: "Wrathless, Phone, London." Telephones: City 2681 & 2682.



CABLES.



OVERHEAD LINES.



MOTORS and GENERATORS.



SWITCHGEAR and TRANSFORMERS

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E.7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159W.George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

SAMUEL MERCER & CO.,

Telegrams RECONCILED CANNON, LONDON

Proprietor—S. J. MERCER.

Telephone: CITY 6342.

Metals for Aircraft.

MILD STEEL SHEETS SPECN. S3 & 9A. Passed & Stamped A.I.D.

BEST CHARCOAL TINNED & LEAD COATED.

BLACK C/R and C/A SHEETS.

GALVD. SHEETS.

BRASS AND COPPER SHEETS.

SOLDER. INGOT TIN.

WELDING WIRE.

COPPER BITS, ETC.

LARGE STOCKS IN OUR OWN WAREHOUSE.



Immediate Deliveries.

Manufacturers of Solder for all purposes.

198, UPPER THAMES ST., LONDON, E.C.4.

The Future

To-day, individually and nationally we live for it!

Unconsciously, our every present action is influenced thereby.

The Past, with its many faults and failings, we endeavour to forget.

The Present, so full of perplexing problems, needs all our energies, but—

The Future ever looms large on the horizon, and, realizing its vast possibilities, even while we struggle through our present difficulties, we make such plans as will enable us to better resume our dealings with old customers and, before, and in the early days of, Peace, make many new friends.

And we think those plans will interest you so we ask you to get in touch.

SUCKLING

Wm Suckling & Sons

KINGSWAY HOUSE, ALBION ST., BIRMINGHAM.

LONDON: MORLEY HOUSE, HOLBORN VIADUCT :: E.C.1.

1329

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
Capacity: 2 pints of glue.
Loading: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
Weight: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



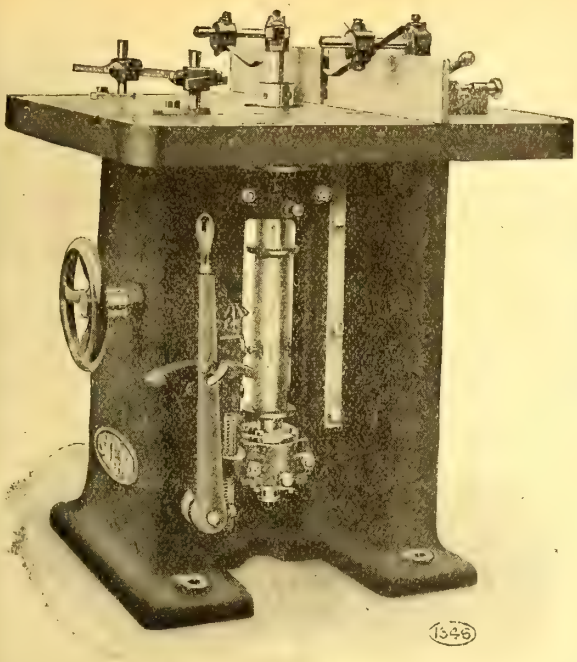
List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.



SAGAR

THIS ILLUSTRATION shows

OUR LATEST TYPE

Heavy Single Spindle Moulding and Shaping Machine

Spindle is exactly central with main Frame in all directions, and revolves in ROLLER BEARINGS.

Several other new features.

Fuller Particulars on request.

We make a complete line of Woodworking Tools for Motor Body Builders, Aircraft Constructors, etc., and shall be pleased to send full particulars of our manufactures to any one interested.

J. Sagar & Co., Ltd., Saw Mill Engineers, **Halifax,** Eng.

LONDON OFFICE: 60, WATLING STREET, E.C.




CELLON
NON-POISONOUS
DOPE
CELLON, LTD.,
22, Cork Street, W.1.
Telephone: Gerrard 440 (2 lines).
Telegrams: "AJAWB, Reg, London."
SBAC
CELLON WORKS
GEOFFREY WATSON 19.7

ardened tungsten steel, the heads and stems being made in one iece from forgings.

All valves and valve springs should be easily accessible, the ormer to allow for easy adjustment. The latter should be of ufficient size to permit high volumetric efficiency.

For large internal combustion engines certain laws are laid own for determining the correct size of valves, but as the design f the valve is much different from that used in an aero-engine, ie same rules cannot be applied for aero-engine design.

Here it is good practice to depend upon experience for the orrect size and type of valve to be used. When experimenting vith a new type of engine, the valves should be very carefully vatched to detect the slightest sign of burning.

Width of Valve Seats.

For aero-engine construction the width of a valve seating may e determined by the following simple rule, found by the experi- nce of the author to be satisfactory :—

D x 1/16 in. + 1/16 in. = Wv.

hat is, where D equals the diameter of the valves in inches, nd Wv is the width of the seating.

For instance, the seating of a valve two inches in diameter ·ill be 3/16in. wide, that of a valve three inches in diameter ·ill be ¼in. wide, and so on.

The additional 1/16in. is to allow for the overlap of the valve eat over that in the cylinder head. This is illustrated in Fig. o, which shows the complete seating of a valve, the seating in ie cylinder head being indicated by the dotted lines.

Valve Construction.

The later types of aero-engine have proved that the valves used i the earlier design of engine are not satisfactory for the present- ay design. The well-known mushroom-hea valve is now practi- ally a dead letter, as considerable imporvement is shown in the itest types of valves.

In Fig. 21, A, is illustrated the mushroom-type valve. Here it ill be noticed that there is only a small amount of material ove the seating, indicated by the dotted line. This was the ief cause of failure of the valve.

Fig. 21, B, illustrates the present-day design. Here it will be observed that the centre of the valve head is practically hollow, but there is a considerable amount of material above the valve seating.

What has been really done is to transfer the material from the centre to the edge of the valve head. Thus the actual weight of the valve is not increased.

This revision in valve design serves two useful purposes :—

1. The heat in the valve head, from the exhaust gases, is dissipated to a greater extent than in the mushroom valve, thus reducing the tendency of burning the seat.
2. As there is more material above the seat, the process of re-grinding may be carried out without fear of reducing the width of the seat.

Valve Springs.

Valve springs for aero-engines are generally of the spiral or ribbon type. The first type is to be preferred if it can be adopted with convenience—that is, where there is sufficient valve lift to allow the spring to be easily depressed. A system of double spiral springs is sometimes used, a small spring being fitted inside a larger and stiffer spring. This system, which ensures the maximum pressure on the valve, reduces the stress on the springs.

Ribbon springs are constructed from strips of spring steel, hardened in oil. They have the advantage of being able to be fully depressed without causing undue stresses on the material. They are very suitable for valves having a small lift. If they are used for valves having a high lift it would be necessary considerably to increase the cross section of the material, this being a serious disadvantage.

Strength of Valve Springs.

The strength of a valve spring should be such that the pressure on the valve seating, when the valve is closed, is between 30 and 60 pounds according to the size of the valve. A three-inch inlet valve should be subjected to a pressure of about 60 pounds.

(To be continued.)

AN INGENIOUS MACHINE TOOL.

Mr. Arthur Collier, of Electric Avenue, Brixton, S.W., has laced upon the market an appliance called the "Arco" Bit, for hich a provisional patent has been granted. This bit has been specially designed to bore clean holes in wood or other material, nd especially in ply-wood, and it results in exceptionally finished ork.

While it seems undesirable to describe the tool in detail, it ay be said that considerable success has been attained in air- aft factories, one of which has tested the bit for ten weeks, mploying it to bore 3¼in. holes through eight thicknesses of in. 3-ply wood at a time. This was done on an ordinary ½in. ood boring machine running at 1,500 r.p.m.

The appliance is manufactured for boring holes from 1¼in. to ¼in. by eighths, and two shanks or holders only are required carry the whole range.

RUSTLESS IRON FITTINGS.

A new company has been formed, called Rustless Iron Cowper-Coles Process), Ltd., with offices at Shepperton.

The company will specialise in Rustless fittings of all descrip- ons, especially for seaplanes and aeroplanes, also railway and ip's fittings, and have acquired some important improvements Sherardising from Mr. Cowper-Coles, also a new process called Doxidising," which is specially suitable for iron and steel work xposed to salt water, as the zinc coating is protected from corro- ion.

A TIMBER-SAVING PROCESS.

The Robert Temple Manufacturing Co., Ltd., of 13-15, Brew- ouse Lane, Putney Bridge, S.W.19, has introduced a process hich should be valuable in the conservation of existing timber upplies.

Mr. Temple, the inventor, has, for several years past, been xperimenting in various forms of laminated timber, with xcellent results.

By bending the fibres of the timber in the direction of the oad, without the use of steam or heat, he has been able to roduce a material which is claimed to be stronger than metal, eight for weight.

Under a recent test a component of a machine made under his system proved to be three times as strong as an aluminium omponent weight for weight, which it has replaced.

It will be readily seen that work of this description is of vital nportance to the Aircraft Industry, and there is no doubt that iany of the fittings on aeronautical machines will shortly be replaced by this work, which of course has a considerable advantage over a metal component.

The process does not require highly skilled labour, and can for the most part be manufactured by female labour.

A great factor is that only the actual amount of material required in the work is used up, as by this process the work is moulded to shape. This is of enormous advantage owing to the present scarcity of material. Many shaped articles constructed on present methods entail at least 50%-70% waste.

It is claimed that the process results in great saving of material, great strength, and perfection in shape. All the work is absolutely weatherproof, and will not cast or twist, and it should therefore be of great use to the engineering trade for the purpose of making patterns, owing to its great strength and retention of perfect shape.

With their several different processes the firm claims to be able to produce practically any shape or form, in one piece of laminated plywood, without the aid of any interior construction, and they feel quite confident in affirming that in the many different forms in which their work can be employed it gives equal strength and saves 50% in weight over existing systems.

For obvious reasons the process cannot be described in print, nor can illustrations be introduced, but aircraft constructors who are interested are invited to apply to the firm in question.

AIRCRAFT ENGINE EXPERIMENTS.

An Order has been made by the Minister of Munitions, under the Defence of the Realm Regulations, which will give the authorities control of all experiments in the construction of engines for aircraft.

The Order provides that on and after May 15th no person may begin or proceed with the experimental construction of any aero-engine without a licence from the Minister of Munitions, for which written application must be made to the Director-General of Aircraft Production, Kingsway, W.C.2.

The applicant must give full particulars of the construction for which the licence is required, and such further information as the Director-General may require, and must comply with any restrictions or conditions that he may impose.

For the purpose of the Order "the term experimental construction means any construction which is not under or for the direct purpose of fulfilling a Government contract, and shall include the preparation of any working drawings, but not the preparation of general arrangement drawings."

Where a first application for a licence under the Order has been made and is pending for the carrying on of any experimental construction begun before May 15th, such construction may be carried on until the licence has been refused.

PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane, from the Current Official Patents Record :—

Patent Applications.

Addis, W. A. Fuselage longeron fitting for aeroplanes. No. 6799. April 23rd.
Aeronautical Instrument Co. Aircraft. No. 7375. May 2nd.
Aeronautical Instrument Co. Aircraft. No. 7446. May 3rd.
American Rubber Co. Aeroplane structural elements. No. 6933. April 24th.
Barlow, F. S. Levels or clinometers for aeroplanes, etc. No. 7215. April 30th.
Bozon, R. Means for controlling aeroplanes. No. 6976. April 22nd.
Burchell, W. B. Device for attachment of cables, wires, etc., upon aircraft. No. 7233. April 30th.
Doyle, K. D. Apparatus for teaching bomb-dropping from aircraft. No. 6907. April 24th.
Dunlop Rubber Co. Wheels for aircraft, etc. No. 7321. May 1st.
Dutton, W. T. Speedometers for aircraft. No. 7299. May 1st.
Fleming, A. Air defence. No. 6872. April 23rd.
France, A. G. Turnbuckles or wire-straining devices for aeroplane wires, etc. No. 6951. April 25th.
Frewer, S. H. Equilibrium indicator for aircraft. No. 7274. May 1st.
Gaynor, T. F. Oceanic-aerial navigation and transportation system. No. 7307. May 1st.
Gray, C. H. Frame members for aeroplanes. No. 7429. May 3rd.
Janoir, L. Hulls of flying-boats, hydroplanes, etc. No. 6765. April 22nd.
Janoir, L. Hydroplanes, seaplanes, or flying-boats. No. 6766. April 22nd.
Jones, L. Aeroplanes. No. 7304. May 1st.
Kemp, W. F. Bomb-dropping apparatus for use upon aircraft. No. 6770. April 22nd.
Kingsley, O. Device for indicating inclination of aeroplanes. No. 7291. May 1st.
Knight, C. N. Clinometers for aeroplanes, etc. No. 6797. April 23rd.
Lewis, A. Propellers for aircraft, etc. No. 6758. April 22nd.
Lewis, F. J. Undercarriage for aircraft. No. 7340. May 2nd.
Lundin, C. O. Apparatus for indicating speed of ships, aircraft, etc., and/or recording distances travelled thereby. No. 7329. May 1st.
Mitchell, W. Internal-combustion engine for aircraft. No. 6792. April 22nd.
Molyneux, C. Aeroplane. No 7102. April 22nd.
Mooney, D. J. Metal spars and longerons for aircraft. No. 6897. April 24th.
Mooney, D. J. Metal spars for aviation. No. 6898. April 24th.
Morris, P. H. Level indicator for aeroplanes, etc. No. 6746, April 22nd.
Naylor, W. N. Coverings for aircraft wings, rudders, etc. No. 7442. May 1st.
Patent Corporation. Flying machines. No. 7493. May 4th.
Pilling, J. Reinforcing wooden parts and structures of aeroplanes. No. 7013. April 26th.
Rey, J. Self-acting sales or blades of windmills, tractor, or pusher screws of aircraft. No. 7225. April 30th.
Robbins, J. Preparation or dope for treatment of fabrics for aircraft. No. 7111. April 27th.
Robbins, J. Woven fabrics for covering wings of aeroplanes, etc. No. 7095. April 27th.
Robinson, P. J. D. Pressure-tight enclosures for aircraft. No 6955. April 27th.
Roe, A. V. Apparatus for doping, varnishing, etc. No. 7100. April 27th.
Rulkens, W. J. Speed indicator for aircraft. No. 7525. May 4th.
Stebbing, H. W. Device for ejecting and opening a parachute, for use with aeroplane, etc. No. 6867. April 24th.
Steele, A. M. Instruments for ascertaining inclination and/or direction of travel of flying machines, submarines, etc. No. 7268. May 1st.
Stonebridge, C. Pots or kettles for containing dope, paints, varnishes, etc. No. 7471. May 3rd.
Thompson, W. P. Flying machines. No. 7493. May 4th.
Turquand, A. St. V. Aerial warfare. No. 7511. May 4th.
Walker, J. Propellers of aeroplanes, waterplanes, etc. No. 7350. May 2nd.
Wall Papers Manufacturers, Ltd. Varnishes or dopes for fabrics of aeroplanes, etc. No. 6909. April 24th.
Walton, T. Aerial bomb for dropping from aircraft. No. 7425. May 3rd.
Ward, T. W. Construction of wings, etc., of aeroplanes. No. 7127. April 27th.
Warburton, S. Spherical level detector applicable to aircraft, surveying, levelling, etc. No. 7286. May 1st.
Westman, C. J. F. Means for launching boats or aerial machines from ships. No. 7136. April 27th.
Wilson, W. A. Aeroplanes, hydroplanes, etc. No. 6982. April 25th.

Complete Specifications Accepted, Prints of which can be Obtained on and after May 16th, 1918.

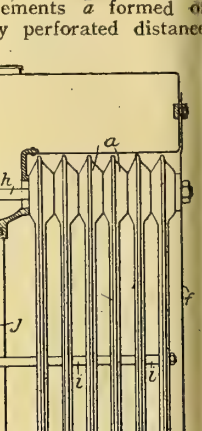
114,858. Jan. 23rd, 1917. Williams, J. W., and Williams, W. J. Heavier-than-air flying-machines.
114,869. March 19th, 1917. Delaney, L. T. Radiator for use on aeroplanes or other vehicles and for use in connection with the cooling of internal-combustion engines.
114,891. April 18th, 1917. Moore, E. H. Alighting-gear for aeroplanes.
114,919. May 9th, 1917. Porter, J. R. Aeronautical machines.
107,009. May 29th, 1916. Vedrines, J., and Astoux, L. L. Landing-wheels of aeroplanes.
114,966. Sept. 7th, 1917. Taylor, W. Apparatus for condensing and retaining compressed gas in a receiver, for use in connection with motor-vehicles, aeroplanes, motor-boats, or the like.

Complete Specifications Accepted, prints of which can be obtained on May 23rd, 1918.

115,060. March 20th, 1917. Prost, C. Flying machines.

Abridgments of Recently Published Specifications.

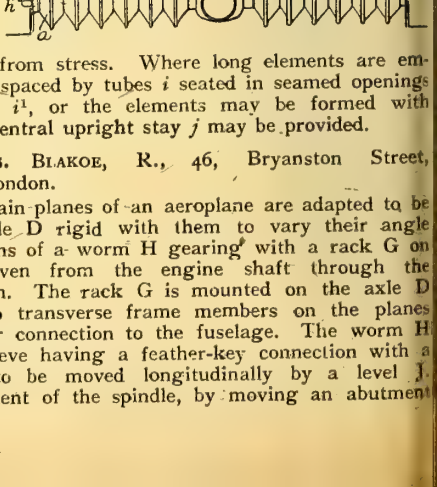
113,683. Pistons. Sadgrove, H. F. V., 34, Blenheim Road, Moseley, Birmingham.



An aluminium or like piston for an aeroplane or like engine is strengthened by an internal structure of steel, etc., which is secured in position during casting and comprises an end disc *a* which may be perforated and is connected by rods or tubes *e*, *f* to blocks *c*, *d*, which are afterwards bored to form the bearings of the gudgeon pin. The disc *a* and blocks *c*, *d* are formed with positioning-pegs a^2.

113,651. Radiators for Internal Combustion Engines. Goudard, M. and Mennesson, M., 190, Avenue de Neuilly, Neuilly, Seine, France.

In radiators of the kind comprising elements *a* formed of stamped sheet-metal plates spaced apart by perforated distance rings *b* forming supply passages, a group of elements is arranged on each side of a central supply passage d^1 from a reservoir *c* and a corresponding central outlet d^2. The elements may be shaped so as to be easily centred, and the distance rings *b* are preferably formed from rolled sheets of such a strength that they may be crushed so as to form a good joint when the elements are assembled on bolts *h*. End plates *f* secured to the reservoir, are held in position by the bolts *h* so as to relieve the elements from stress. Where long elements are employed, they may be spaced by tubes *i* seated in seamed openings and carried by rods i^1, or the elements may be formed with stamped bosses. A central upright stay *j* may be provided.



113,629. Aeronautics. Blakoe, R., 46, Bryanston Street, Marble Arch, London.

Steering.—The main planes of an aeroplane are adapted to be turned about an axle D rigid with them to vary their angle of incidence by means of a worm H gearing with a rack G on the planes and driven from the engine shaft through the reversing-gear shown. The rack G is mounted on the axle D and is connected to transverse frame members on the planes which have no other connection to the fuselage. The worm H is mounted on a sleeve having a feather-key connection with a spindle I adapted to be moved longitudinally by a level J. Longitudinal movement of the spindle, by moving an abutment

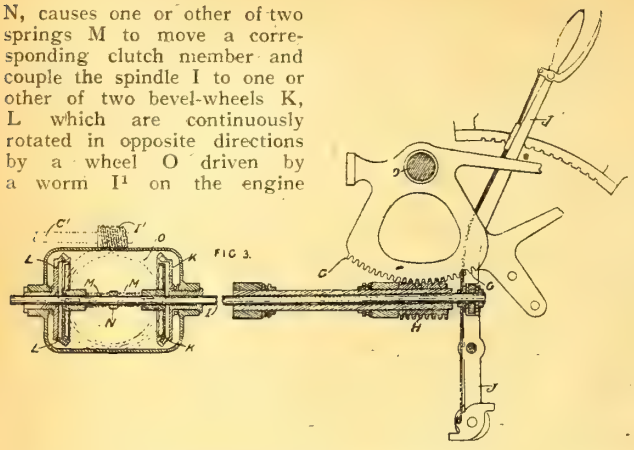
FURTHER CONTRACTS WANTED IN WOOD AND METAL

A LARGE Government Controlled Establishment in the N. W. of London, with complete woodworking, engineering, sheet metal and welding plants, with a Works covering 2½ acres, is in a position to accept further contracts, both for complete machines and spares, in wood or metal, specializing in the following: Fuselages (complete with controls), Main Planes, Undercarriages (wood or tubular), Tail Planes, Rudders, Fins, Elevators, Ailerons, Detail Metal Fittings, Machining, Pressure and Gravity Oil Tanks, Cowling and Welding. Having just finished important contracts of various well-known types and familiar with the most up-to-date types on the present market, can give quick and immediate deliveries both in wood and metal, the Works now being available for any further contracts.

Box No. 1,000, "The Aeroplane,"

166, PICCADILLY :: :: :: :: W.1.

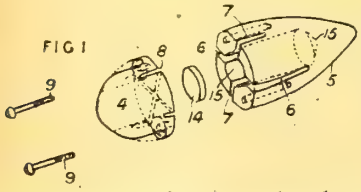
N, causes one or other of two springs M to move a corresponding clutch member and couple the spindle I to one or other of two bevel-wheels K, L which are continuously rotated in opposite directions by a wheel O driven by a worm I^1 on the engine

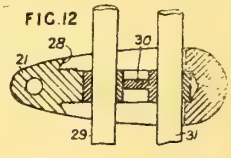


shaft C^1. The resulting motion is transmitted to the sleeve carrying the worm H and the planes are adjusted.

113,673. Aeronautics. Anderson, A. L., 6, Springfield Road, Gatley, near Cheadle, Cheshire, and Anderson, R., 1429, Ashton Old Road, Higher Openshaw, Manchester

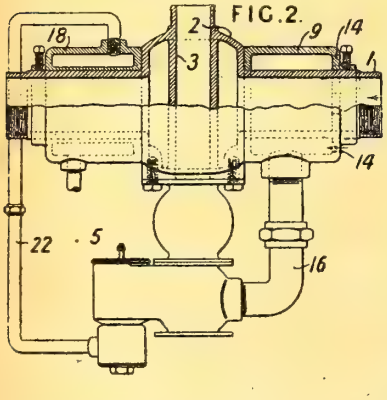
Framework; Planes; Arrangement of.—A device for locking together two or more bracing-wires at their crossing comprises two clamping-members slotted to take the bracing-wires and presenting a streamline form when secured together. Fig. 1 shows one form in which two members 4, 5, of circular or





elliptical cross-section, are slotted at 6, 7, 8 to take two flattened or streamline bracing wires. The wires may be separated where they cross by a washer 14 of resilient or inelastic material accommodated in a bore 15. Screws 9 secure the two parts together. The washers 14 may be of aluminium or lead. Fig. 12 shows a modification in which a solid rear portion 21 screws into the front slotted portion, which has a bevelled rear edge engaged by an undercut portion 28 on the rear portion to prevent the slotted portion from bursting. Three flat wires 29, 30, 31 arranged between insulating-washers are shown. The section shown is taken through one of the slots.

113,760. Internal-combustion Engines. Olsen, G. O., 729, Morton Street, Mattapan, Massachusetts, U.S.A.



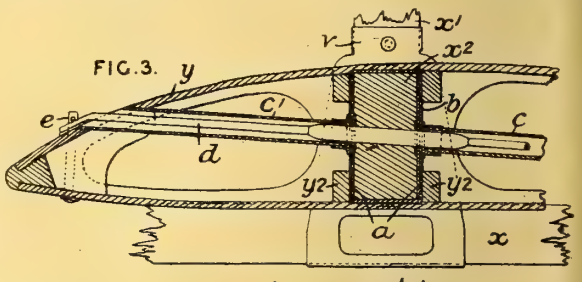
Carburetting.—Air and fuel are heated both before and after mixing. The exhaust passes through a pipe 1, an enlargement 2 of which is traversed by the induction pipe 3. A casing 9 surrounds one portion of the pipe 1 and is provided with openings 14 and a discharge pipe 16, so that air is drawn to the carburettor 5. Similarly, fuel from a reservoir is drawn to the carburettor through the exhaust-heated chamber 18 and passage 22. The chambers 9 and 18 may slide on the exhaust pipe, and be fixed by set-screws.

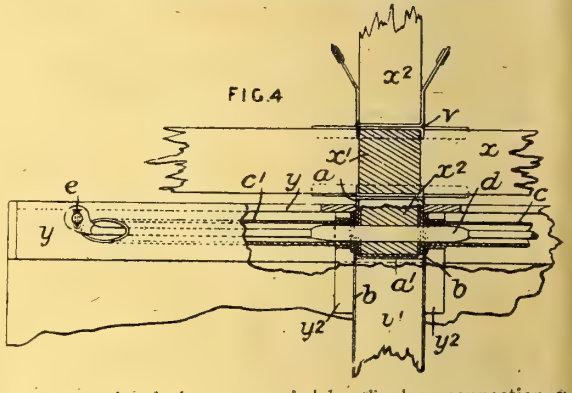
113,736. Aeronautics. Jackson, W. J. Mellersh-, 28, Southampton Buildings, London.—(Goodyear's India Rubber Glove Manufacturing Co., Maple Street, Naugatuck, Connecticut, U.S.A.)

Planes, Construction of.—Aeroplane structural elements, for example, the wings, pontoons, rudders, stabilisers, and wind shields, are formed by heating a hard rubber-containing sheet to give it greater extensibility, securing the stretched sheet to a supporting-frame, and permitting the sheet to shrink. The entire sheet may be heated simultaneously, or portions of the sheet may be heated successively, for example, by a flatiron. The sheet may be temporarily secured to the frame before heating and stretching.

113,723. Aeronautics. Sopwith Aviation Co. and Hawker, H. G., Canbury Park Road, Kingston-on-Thames, Surrey.

Planes, Arrangement of.—The wings of aeroplanes are connected to the fuselage or centre section by a longitudinal hinge consisting of a single pin passing through hinge members forming extensions of the transverse spars of the fuselage and of the spars of the wings. The inner member of the hinge is con-



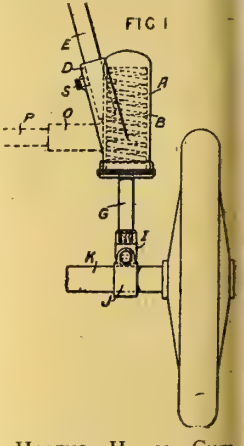


stituted by a pair of plates *a* carried by the box connection *v* of the fuselage framework, and connected together by a channel member a^1, and the outer member of the joint comprises a box *b* arranged within the inner rib *y* of the wing and carried by the spar y^1. The hinge-pin *d* passes through guide-tubes *c*, c^1, and is secured by a pin *e*. The transverse member x^2 of the fuselage may extend within the joint.

Planes, Construction of.—Strengthening fillets y^2 are fastened to the spars y^1 and the rib *y*.

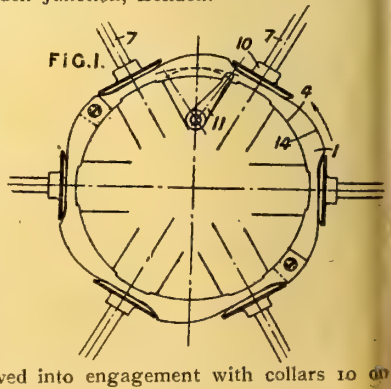
Framework.—The longitudinal, vertical, and transverse members *x*, x^1, x^2 of the fuselage are connected together by a box *v*.

113,874. Aeronautics. Pease, W. H., Brook House, Blythe Street, Mapperly, Nottingham.



Shock of Landing, Deadening.—A spring buffer for the land wheels or floats of aircraft comprises a cylinder A, having integrally-formed sockets D to take struts E, extending from the fuselage, the cylinder A containing a spring B, which bears on a piston carried by a rod G. In the form shown, the rod G has a swivel connection I, J, with an axle K, the slot in the member I being elongated to allow lateral movement as the axle tilts. An additional socket O is provided for a lateral stay P. The struts E are secured in their sockets by transverse pins held in place by caps S screwed into nipples in the sockets.

113,752. Internal-combustion Engines. Hagens, H., 31, Cumberland Park, Willesden Junction, London.



Valve-gear; Regulating; Starting; Cylinders, Cooling.—Radial-cylinder engines for aeroplanes, etc., are provided with supplementary cam mechanism, which actuates all the exhaust valves simultaneously to reduce the compression at starting, or to admit air to the cylinder for cooling purposes. The supplementary cam 1 comprises a number of swells, 14 which are moved into engagement with collars 10 on valve rods 7 by a hand-lever 11.

Firth's
"Speedicut" High-Speed Steel
For turning Tools.

"Speedicut" Milling Cutters
and Drills
For all workshop purposes.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

THE AIRCRAFT CATALOGUE.

TO stand still is to stand alone—In August, 1915, The Aircraft Supplies Co., Ltd., issued a Stock Sheet only, to-day "Aircraft Supplies" is a 24 page journal and Catalogue of Aircraft Metal Parts. It is issued on alternate Tuesday evenings (next issue May 28th), and is sent free to those engaged in the Aircraft Industry.



"AIRCRAFT SUPPLIES."

THE "ASCOL" BOOK

Will be published in a few weeks' time and included in the 200 pages will be reprints of all the articles which appeared in the first two volumes of "Aircraft Supplies," A.G.S., and "Ascol" Chart Sections, and a Beginner's Guide. Copies at 3/6 and 10/6 each (postage 6d. extra). Advertisement rates on application.

ORDER NOW.

Total proceeds of sales given to charity.

THE AIRCRAFT SUPPLIES COMPANY LTD

CONTRACTORS TO THE AIR BOARD.

Head Offices, Showrooms,

ASCOL HOUSE, 125 LONG ACRE, LONDON W.C.2.

Representatives in Birmingham, Manchester, Leeds, Belfast, Northern Counties and Scotland, South Coast and the London District.

Managing Director. G. H. MANSFIELD.

LITTLE JAMES ST., LONDON :: W.C.1.

Telephone: GERRARD ... ... 276. Private Branch Exchange.

Telegrams: "UPCAST, RAND," LONDON.

ASCOL

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

May 9th, 1918.

COPPER.—Supplies are being received very promptly, and although it is rumoured in some quarters that the demand is in excess of the output the figures for April are very gratifying, and it is expected that the May output will also show a substantial increase over April. There does not therefore appear to be any cause for anxiety.

It is understood that the Government has arranged with the Australian Copper Producers Association for the whole of the Australian Producers' output to be sent here, less quantities still to be supplied under existing contracts and quantities required for home consumption.

The price to be paid is £109 10s. 0d. per ton f.o.b. Sydney, for Electrolytic, £107 6s. 0d. per ton f.o.b. Sydney, other kinds; if the proportion of the latter exceeds one-fourth of the total tonnage the Association is to allow £4 6s. 8d. per ton abatement, making the price £105 3s. 4d. per ton.

The maximum quantity to be delivered against the contract is 20,000 tons, and the minimum quantity 15,600 tons. If the former is exceeded a price will be mutually agreed for the surplus; if the latter quantity is not reached the Government can claim delivery of the deficiency later at the contract price.

Although the agitation for an increase in price, to come into force after June 1st, still continues there is a strong feeling that there will not be any alteration.

TIN.—The price of Tin has risen to a most absurd figure, and is undoubtedly due to the extortionate prices which are being demanded by speculators in the East, who are apparently controlling the whole situation.

On April 26th the Ministry of Munitions took over the control of Tin, Mr. W. A. Tennant being appointed the Director of Tin Supplies.

This step has not yet had any effect upon prices, and there does not appear to be any hope whatever of the price being brought down to a reasonable level until some kind of a control is exercised over the Eastern market.

About three quarters of the world's supply of Tin comes from Eastern sources, i.e., Straits Settlements, Banca, Billiton and Hong Kong, and both this country and U.S.A. are dependent upon them for supplies. It is, therefore, very essential that some drastic action should be taken to put an end to the speculation which is being carried on in the East at the expense chiefly of ourselves and U.S.A.

Comparative Prices.

To-day	£380	0	0	per ton.
May 2nd	£360	0	0	per ton.
April 26th	£350	0	0	per ton.
April 22nd	£333	0	0	per ton.
April 19th	£330	0	0	per ton.

Supplies of Tin for Government contracts are procured with much delay. It is, however, still impossible to procure any for domestic purposes.

STEEL.—The feverish activity of the mills continues and the efforts which are being put forth are certainly bearing fruit.

There is very little difficulty in obtaining supplies, and the position generally is most satisfactory.

Some of the producers are demanding an increase in price, and it is understood that the question is being considered by the Ministry.

TIMBER.—The question of supplies is as irritating as ever and developments are anxiously awaited. It is understood that permission is being given for common timber to be used on laminated work. It is, however, not quite clear whether the authorities expect the wood to pass VI Specification, or whether constructors have permission to use the wood, notwithstanding its failure to pass the specification tests.

Larger quantities of hardwood have been received recently. The arrivals are, however, still on the light side. The Plywood position continues to improve, due primarily to the energy and activity of the few firms manufacturing the boards, notwithstanding the heartbreaking obstacles they have been compelled to overcome.

FABRIC.—Supplies are very satisfactory and official prices remain unaltered.

MONTHLY MARKET PRICE LIST.

May 5th, 1918.

The prices given below are the prices ruling on the above date.

Terms.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.

Ingot	£225 per ton.*
Remelted	£210 per ton.*

Brass.

Sheets	15¼d. per lb.
Strip	14¼d. per lb.
Wire	14⅝d. per lb.
Tubes	16¼d. per lb.
Castings	16d. per lb.
Turning Rod	13½d. per lb.
Brazed Tubes	19½d. per lb.

Copper.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (net)	£123 to £119 per ton.
Sheets	£149 per ton.
Wire	15½d. per lb.
Tubes, S.D.	19d. per lb.
Tubes, Brazed	19d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.

Fabric.

Linen, R.A.F., 17C, Spec. 36 in. wide, 3s. 1d. p. yd.*
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 2s. 1d. p. yd.*

Gun Metal.

Castings, Plain ..... 1s. 8d. per lb.

Lead.*

Virgin Pig	£29 per ton, c.i.f. net.
Virgin Pig	£30 per ton, ex stores net.
Sheets	£39 10s. per ton, D/d. net.
Pipes	£40 per ton net.
Dry White	£46 10s. per ton, less 5 per cent.
White in Oil	£53 per ton (lots over 5 cwt. less 5 per cent.)
Red in Oil	£42 per ton, less 2½ per cent. (lots under 5 cwt. less 5 per cent.)
Red in Oil	£42 per ton, less 2½ per cent.

Nickel.

Nickel ..... £230 per ton.

Phosphor Bronze.

Ingots, 5cwt. and under	£159 to £181 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 8¼d. to 2s. 0¼d. per lb.

Phosphor Copper.

Ton lots ..... £200 to £205 per ton.

Silver.

Silver ..... 49⅛d. per oz.

Solder.

Plumber's	159s.
Tinman's	203s.

Steel.

High Speed, 14 p. cent., Tungsten, 3s. 8d. p. lb., basis.*†
High Speed, 18 p. cent., Tungsten, 4s. 5d. p. lb., basis.

Alloy Steels to Air Board Specifications.

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£86
Specification No. S10	£70
Specification No. S12	£75

Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes are proportionate.

HEXAGONS.

	.455 and .525	.601 and .710.
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn), £112		£112
Specification S8 (bright-drawn), £112		£112

SPELTER.

English f.o.b., Birmingham	£54-£50

TIN.

Tin	£380

TINPLATES.

Tinplate	33s. 6d., basis, f.o.t.*

TIMBER.†

	Official.	Merchants.
Silver Spruce,	10s. 4d.	18s. 6d., c.f.
English Ash		16s., c.f.
Mahogany,	1s. 10d. to 2s.—2s. 3d. to 2s. 9d.,	s.f.
Walnut,	2s. to 2s. 3d.—2s. 4d. to 2s. 10d.	s.f.

ZINC.

Zinc Sheets (American)	£100, f.o.b., New York.

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing below 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0

SCRAP MATERIALS (LONDON PRICES).

Brass, Heavy Selected	£88
Copper, Clean	102
Copper, Brazery	80
Gun-metal, Scrap	125
Lead, no Draft	26
Zinc, Old	42

*Official Prices.
†Includes Selection and Delivery.

A NEW SUNBEAM DIRECTOR.

A vacancy on the Board of Directors of the Sunbeam Motor Car Co., Ltd., has been filled by the directors, who have elected Mr. Charles N. Wright, of the well-known firm of Fowler, Langley and Wright, to the office. Thus the Board becomes greatly strengthened on the legal side, a matter of no mean importance in these days when industry is compassed about with legal restrictions at every stage and turn.

Mr. Wright has lived all his days in Wolverhampton, his father and both his grandfathers having been iron masters with works in the town. On the other hand, the whole of his own career has been concerned with law. In 1888 he was articled to Mr. Henry Hartley Fowler, afterwards Sir Henry Fowler, M.P., and later Viscount Wolverhampton, of the firm of Fowler and Langley, as it was then styled. Mr. Wright was admitted a solicitor in 1893, and became a partner in Messrs. Fowler and Langley's business in 1898, and a notary public in 1914. He was President of the Wolverhampton Law Society in 1912. Sir Henry Fowler, it may be recalled, remained an active member of the firm until 1908, in which year he retired on receiving a peerage.

"AIRCRAFT SUPPLIES."

The fortnightly House Journal and Stock List of The Aircraft Supplies Company, Ltd., has for some time been regarded as holding an important position where aeronautical literature is concerned. From the commencement of the company a stock list has been issued, although in 1915 it was necessarily only a stock sheet. Later the house journal made its début, and since March, 1917, has appeared regularly every fortnight.

The Aircraft Supplies Company, Ltd., with its usual anxiety to assist those engaged in the Aircraft Industry, as well as to provide something more interesting than an ordinary stock list, are including in their house journal, "Aircraft Supplies," topics of interest generally, and an article on some subject of particular interest to the Industry.

Back numbers of "Aircraft Supplies" contain articles on various subjects. These are about to be reproduced in a book being published by The Aircraft Supplies Company, Ltd., entitled "The 'Ascol' Book." This book, in addition to including articles on such subjects as the heat treatment of steel, prime costs, dope and how to use it, and rigging of aircraft, will also contain illustrations of those A.G.S. parts most commonly used and a complete section of the Ascol charts, which now number over a dozen, and also a beginners' guide containing much information of use to those new to the Industry.

The major portion of "Aircraft Supplies" contains a complete list of the parts in stock at "Ascol House" at the time of going to press, and the company claims to have over 5,000,000 different parts in stock on an average.

A casual visit to the showrooms, and particularly to the large warehouse, is convincing proof that "Aircraft Supplies" gives one only a small idea of the amount of business done at Ascol House and the utility of "Ascol Service" to the Aircraft Industry generally.

INSTRUCTION IN FLYING.

Although in these days it is becoming customary for most people to enter into Service aeronautics without previous training, quite a number of prospective pilots would prefer to learn to fly beforehand, in order that their initial attempts may not be made before the very critical eyes of Service instructors. As a matter of fact, there is a good deal to be said for preliminary training, because very often a flying pupil who makes a slow and indifferent beginning ultimately proves to be a better pilot than the man who takes to the air like a duck to water.

The proprietors of the Cambridge School of Flying and Aerodrome Co., Ltd., which is now well established, have laid themselves out to cater especially for the class of person who prefers to adopt this course. With the object of endowing the school with a Service atmosphere the proprietors have procured the assistance of Mr. L. Ryder Knowles, a late Naval pilot, who becomes chief instructor. Mr. Knowles has had considerable experience of flying both at home and abroad, and it will be his work not merely to instruct pupils in the simple art of flying, but to give them a working idea of the various studies which they will have to undertake on appointment to a Cadet Wing, R.A.F., and the initial principles of reconnaissance, bombing, and fighting tactics are suitably handled.

The equipment of the Cambridge School is being kept up to date, and arrangements are being made to start a boarding establishment for pupils during the summer months, in connection with which a reading and recreation room will be provided for the use of all those under instruction where a reference library of all recent aeronautical publications of any value and the various aircraft periodicals will be available.

In addition to the practical flying course, a theoretical course dealing with aeroplane design and construction has been started, which is sent out as a correspondence course to those who wish to learn the principles of aviation at home. The proprietors will be pleased to afford any information desired, and inquiries should be addressed to the firm at 30B, St. Andrew's Street, Cambridge.

GARAGE SUPPLIES FOR AIRSHIPS.

In the Patents Court on May 9th, the Comptroller-General of Patents (Mr. Temple Franks) heard an application foreshadowing the use of garages for the supply of hydrogen for aircraft.

The application was made by Messrs. Samuel Cutler & Son (Limited), engineers, for a licence to use six German patents for the manufacture of hydrogen gas. It was said that one of the patents, in an alternative form of manufacture, claimed the discovery that manganese iron ores could be used as reaction substances in the production of hydrogen.

The applicant said that he was manufacturing to supply the Admiralty for balloons and airships, and the time was coming possibly when private persons would want to set up works at different points for the supply of hydrogen gas.

The Comptroller intimated that he thought the patents should be granted and progress made with the work at once.



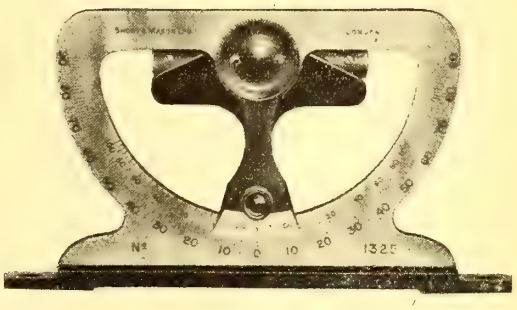
HEIGHT MEASURING

ANEROID ALTIMETERS

(Illustration is Half Actual Size.)

:: FOR EVERY TYPE OF ::

AIRCRAFT



"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES.
— TO CLOSE LIMITS. —

(Illustration is Half Actual Size.)

Manufactured by

SHORT & MASON, Ltd.,

WALTHAMSTOW, LONDON, E.17.

Telegrams: "ANEROID, PHONE, LONDON." Telephone: WALTHAMSTOW 180.

GWYNNES

LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE.

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

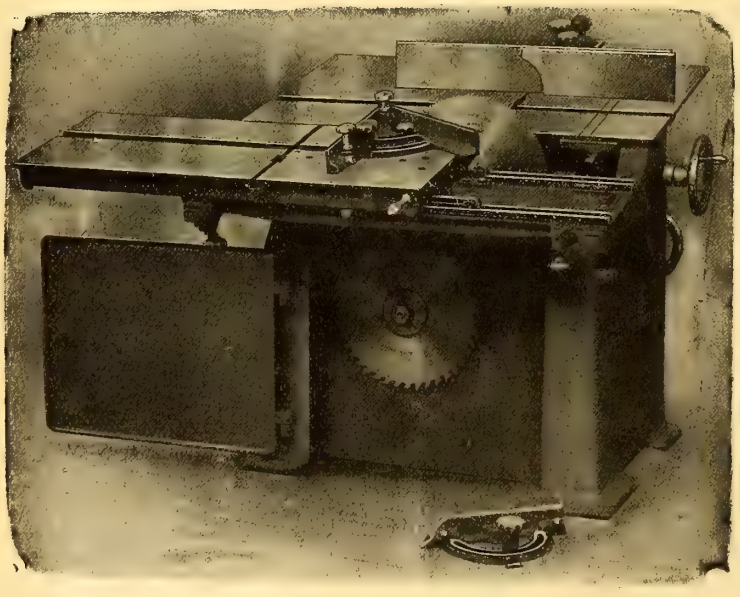
"GWYNNE, LONDON."

Heating & Ventilation
for
Aeroplane Factories
Munition Shops
Dope Rooms
etc.

ROSSER & RUSSELL LTD
HEATING ENGINEERS
"Manchester House, 37. Duke St, Oxford St, W1.
Telephone Mayfair 5210. Telegrams. "Lesorus Hammer London

Work in hand
at the present time for
Messrs. Handley Page Ltd
National Aero Engine Co
Gnome & Le Rhone Engine Co
and many others

May we quote you for your requirements



IMPROVED
AIRCRAFT
MACHINERY.

Two-Spindle Dimension Saw Bench for Ripping, Cross Cutting, Mitring, Bevel Cutting, Grooving, &c.

TYPE LS.

Further particulars on request.

Thos. Robinson & Son LIMITED
ROCHDALE

AIRCRAFT FINANCE

CURRENT TOPICS.

CHEAPENING MONEY.

What the Financial World is particularly concerned about just now is the possibility of the Government inducing the banks to lower the value of money in order to stimulate subscriptions to the War Bonds. It is of importance to the manufacturer as well as to the Government. The banks would reduce the rate of interest for money on deposit with them, so that it would seek more remunerative employment elsewhere, say, in War Bonds.

Coincidently the banks should in normal circumstances grant financial accommodation for ordinary industrial purposes on correspondingly reduced terms. But times are far from normal.

Share Market Activity.

In the Stock Exchange there is a tone of confidence which would be even more marked if domestic politics provided less irritation. Quite a large business is passing in engineering shares, like Vickers, Armstrong Whitworths, Birmingham Small Arms and Beardmores, while purely aircraft descriptions have not been neglected.

For instance, Aircraft Manufacturing 7 per cent. "B" Participating preference shares are in the neighbourhood of 23s. According to gossip their participating rights are becoming more valuable owing to the increasing profit-earning capacity of the business.

French Aircraft Profits.

By the way, the results of the Morane-Saulnier Aeroplane Company have recently been published: they are interesting because of the light they throw on working conditions in France. The net profits are given as 755,388 francs after providing 1,649,738 francs for the war-tax in respect of the preceding year.

Increased Production Costs.

It is remarked that the net profit represents a decrease of 25 per cent. on those of 1916 in spite of the fact that the output increased by 30 per cent. This is ascribed to higher wages and the increased cost of materials as well as to stoppages. General expenses, which were 1,799,275 francs in 1916, rose to 3,234,230 francs.

What the U.S. is Spending.

It is interesting to read that the U.S. War Department has asked Congress for a $1,000,000,000 appropriation for aircraft production in addition to the $640,000,000 already expended.

There is just published the report of Straker-Squire; it covers a period of twenty-seven months to the close of 1917. After meeting all claims in respect of excess profits there is profit of £28,685, and a disposable balance of £35,000. The sum of £1,660 is written off preliminary expenses and new issue expenses and the dividend for 1917 is 10 per cent., leaving £3,880 to be carried forward.

B.S.A. Prosperity.

A factor of some importance in relation to the strong financial position of the Birmingham Small Arms Co. is the decision of the Daimler Co. to capitalise a portion of its reserve fund The B.S.A. is proprietor of the Daimler Co., and the shares so distributed as a bonus means a bigger income to the Small Arms Co. which has an interest in aircraft, and which is understood to be enjoying exceptional prosperity all round. Hence, B.S.A. shares are being persistently bought up for possibilities.

COMPANIES RECORDS.

VAUXHALL MOTORS, LTD.

The fourth ordinary general meeting of shareholders of this company was held recently, when the Chairman announced that no accounts were available as questions were still open regarding special allowances with the Ministry of Munitions. The profits and turnover had both been increased despite the increasing difficulties in regard to labour and materials.

The Chairman gave some dramatic figures of the company's position in regard to labour, demonstrating the difficulties encountered and surmounted by dilution of labour. He emphatically stated that "we have now arrived at the absolute minimum of skilled and unskilled men that we must employ if the Ministry of Munitions require us to carry out our contracts, and I suggest that the time has arrived when the authorities have got to choose between taking more of our men or curtailing our production, for they cannot have both.

Contract Prices.

"The production has been much greater than in the preceding year, though the profits are less, owing to the reduction in the price. I may here mention that the price is fixed by the Ministry for the whole of our output, and thus the accusation of extravagant prices said to be paid to munition makers has no foundation in fact in our case. Perhaps it would not be out of place here to say that, as the result of recent happenings at the front, we may be called on for still further contributions both in the way of taxation and man-power. We hope, of course, that we shall not experience either, but if the latter, then it will very seriously affect our output.

Looking Ahead.

"There are two very serious matters of perhaps greater importance from a post-war point of view than just now. The first is the proper training of apprentices, which I am afraid has been rather sadly neglected in our industry in the past. We hope to remedy this to some extent, at any rate as far as we are concerned, by starting a proper school for training boys thoroughly and properly in every department of the motor industry. This is a scheme which is of national importance, if we are to maintain our position in the commercial fight when the war is over.

"The other scheme we are interested in is the proposed housing scheme to be subsidised by the Government. We are very badly in want of good housing accommodation, particularly near our works, and we feel that some housing scheme has got to be considered by us at once if we are to attract and keep the skilled labour we shall require after the war, so we feel the Government's proposals in connection with this matter have come at an opportune moment, and I hope I shall be able to report some further progress in this matter next year."

BRITISH ALUMINIUM CO., LTD.

At the recent annual meeting of this company, the Chairman made some very interesting remarks concerning the enormous strides which had been made in the development and use of aluminium in the construction of airships and aeroplanes. He pointed out that the uses to which the metal is being put at the present time, while largely of a destructive character, will considerably extend the field in commercial enterprise after the war.

There is no doubt that the rapid extension of aircraft has been greatly helped by the use of aluminium in both its pure and alloyed forms, and he predicted that the metal will play an important rôle in all matters relating to aerial construction. The Chairman went on to say:—

"It may be interesting to note, in connection with the rapid development of the use of the metal, that the total world's consumption to-day is approximately five times the consumption of 10 years ago. This rapid increase in its uses has necessitated extensive developments in its production during recent years, and such developments have been made, or are in contemplation, all over the world. The British Government have recognised that this is a key industry, and that it is essential for the future welfare of this country and its industries that the production should be substantially increased.

Extension of the Works.

"Realising the necessity for further development in order to cope with the increased demand, and in pursuance of the express wish of the Government for the increase of productive-capacity in this country, the company have made considerable investigations as to available water supply of sufficient size which could be economically used for the purpose. They finally selected a scheme for the development of hydro-electric power involving a large area in Scotland, and they are making application to Parliament during the present Session for the necessary powers.

"The Board of Trade and the Ministry of Munitions have made their own investigations into the matter, and are satisfied that the scheme which the company has put forward will make the most economical use of the power available, and they have signified their approval and promise of support in the application for the necessary powers.

"The shareholders have already authorised the application at meetings which were held in January last, and, if the application is successful, the powers should be granted during the present year. The scheme, which is a large one, will take some con-

siderable time to develop, and will involve fairly large capital expenditure. The provision of the necessary capital is a matter which will require most careful consideration, but it is not one which calls for decision in the immediate future.

"It is not contemplated, neither will it be necessary, that the whole amount involved shall be issued at one time, although it will be prudent to make provision so that the capital is available as and when it may be required in the course of the development."

VICKERS, LTD.

The shareholders are in receipt of two circulars issued by the company. The first, dated April 17th, in which the Directors announce:—

"Owing to the fact that no settlement of this company's accounts has yet been come to with the Government, the Directors regret it is still impossible to submit any accounts to the shareholders for the years 1915 and 1916, and now for the year 1917, they have, nevertheless, good reason to hope that the accounts for 1915 will soon be completed, and they will then be submitted to the shareholders at the earliest possible date. The completion of accounts for 1916 and 1917 must, however, still be delayed for a considerable time, if only for the reason that owing to the immense mass of work flowing through, it has been impossible to arrive at definite prices with the Government for many of the contracts placed with the company.

"The Directors recognise, however, the inconvenience which would be caused to the shareholders if payment of the final dividend for the year ending Dec. 31st, 1917, were postponed, and feel justified in recommending a final dividend (free of income tax at 5s. in the £) for that period of 1s. 6d. per share, equal to 7½ per cent. (free of income tax at 5s. in the £) on the Ordinary Share Capital. This, with the interim dividend already paid, will make a total distribution of 2s. 6d. per share, equal to 12½ per cent., for the year (free of income tax at 5s. in the £)."

And the second notice dated May 2nd advising shareholders:

It has been pointed out to the Directors that the Second Extraordinary General Meeting, called for the purpose of confirming the Special Resolution of which notice was given recently, was convened by inadvertence for Whit Tuesday.

As this is likely to be an inconvenient date for shareholders, the Directors have decided to hold the Confirmatory Meeting on Wednesday, May 15th, 1918, and of this meeting notice is given overleaf. This will make it unnecessary to hold any meeting on Whit Tuesday.

THE SHAREHOLDERS' MEETING.

Several interesting developments of this vast undertaking were dealt with by the chairman at the 51st annual meeting held at Sheffield on April 25th. After explaining the delays in connection with the production of the accounts and setting out the views of the Board on the question of the income tax in regard to paying future dividends he went on to review the outlook affecting the future of the company.

The Board had given a great deal of attention recently to post-war production, and had discussed the most varied plans for utilising for peace purposes as much as possible of their war plant. As he had said repeatedly before, a great portion of it would be quite unusable, and the best suggestion that he could make was that this class of plant should be taken up and stored in one of their big buildings ready for use in case Germany attacked us again.

He hoped he had made it clear that they had a large programme before them. That programme would be certain to cost a large sum to get into the new trades and carry the new stocks, and for that reason conservation of capital was necessary. He said that because he wished to justify the decision of the directors with regard to the future payment of income-tax on the dividends. He then proposed "that the consideration of the accounts for the past financial year, ending December 31st, 1917, be adjourned, to be considered after the accounts for the years ending December 31st, 1915 and 1916 respectively, shall have been duly considered and passed."

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

The files of the following new companies are available for inspection at Somerset House.

BRITISH AMERICAN AIRCRAFT INVESTMENTS, LTD.—Private company. Registered May 9th. Capital, £1,000 in 1,500 participating preference and 500 ordinary shares of 10s. each. Manufacturers of and dealers in aerial conveyances and components, owners of hangars, garages, sheds and aerodromes, etc. The subscribers (each with one share) are: J. F. Durban, 90, Castlenau, Barnes, S.W.13, law clerk; Evelyn M. Taylor, 3, Angles Road, Streatham, S.W.16, stenographer. The first directors are to be appointed by the subscribers. Qualification: 25 ordinary shares. Remuneration £250 each per annum. Solicitors: H. Dade and Co., 14, Queen Victoria Street, E.C.4.

CROMPTON HAUMAN ENGINEERING CO., LTD.—Private Company. Registered May 6th. Capital, £2,000 in £1 shares. To take over the business of a general engineer carried on by G. Crompton at 55, High Street, Lincoln, and to carry on the business of aeronautical, marine and general engineers, iron, steel and metal merchants, etc. The subscribers (each with one share) are:—G. Crompton, 55, High Street, Lincoln, engineer; J. E. Hauman, 6, St. Ann's Terrace, Barnes, S.W.13, engineer. The first directors are:—G. Crompton and J. E. Haumann (chairman), both permanent.

R. L. DUBOIS AND CO., LTD.—Private company. Registered May 1st. Capital, £2,000 in £1 shares. To take over the business now carried on at 673, Romford Road, Manor Park, known as "R. L. Dubois and Co.," and the business carried on at 5, Khartoum Parade, Ilford, Essex, as "Patenall Co.," and to carry on the business of aeronautical and aeroplane engineers, ironfounders, mechanical and electrical engineers, etc. The subscribers (each with one share) are:—R. L. Dubois, 60, Gladstone Avenue, Manor Park, E.12, engineer; L. Schaer, 78, Larch Road, Cricklewood, N.W.2, engineer. The first directors are: R. L. Dubois, M. C. Bachofer, A. L. Bachofer, L. Schaer, and E. J. Marro. Registered office: 5, Khartoum Parade, Ilford Lane, Essex.

PARKINSON MOTORS, LTD.—Registered May 1st. To carry on the business of electrical and mechanical engineers. Nominal capital £25,000 in 20,000 7 per cent. £1 cumulative preference shares, and 10,000 1s. ordinary shares. Directors and subscribers: E. Parkinson, Greenlaw, Guiseley, and A. Parkinson, 2, Elder Mount, Guiseley.

MORTGAGES, CHARGES AND SATISFACTIONS.

WHITEHEAD AIRCRAFT (1917), LTD.—Mortgage dated April 11th, 1918, to secure £1,000 and interest charged on land and premises in High Street, Feltham, known as the "Hollies." Holders: E. W. Wells, Lampton Road, Hounslow.

BUSINESS NAMES REGISTRATIONS.

INTERNATIONAL AIRCRAFT WORKS.—Registered Jan. 26th, 1918. Aeronautical and general engineers, 12a, Emmanuel Avenue, Acton, W. Partners:—

L. de Borger (Belgian), 332, Fulham Road, S.W.10.
J. Tielemans (Belgian), 156, Coningham Road, Shepherd's Bush, W.
J. Jassin (Belgian), 1, Arminger Road, W.
F. Grenade (Canadian, formerly Belgian), 6, Noel Road, Acton W.

DIVIDEND DECLARATIONS.

A. DARRACQ & CO. (1905), LTD.—The directors announce the declaration of an interim dividend of 5 per cent. on the ordinary shares.

POST-WAR COMMERCE.

The Report just issued of the Committee on "Commercial and Industrial Policy after the War," presided over by Lord Balfour of Burleigh, should be in the hands of every manufacturer and trader in Great Britain.

The recommendations and suggestions are of the utmost urgence and importance to every branch of manufacture and of particular interest to the Aircraft Industry considered from the point of view of post-war deevlopment. Space alone prevents anything like a full account, but the following extracts will suffice to show the far-reaching effects and importance of the subject.

The conclusions embodied in the Report deal, among many other points, more particularly with the following:—

Fiscal Policy.—Development of Imperial resources and the conservation of the Empire's raw materials; internal reorganisation of home industries and the assistance to be granted by the State; financial facilities for trade and the bearing of taxation on industrial development, and last but not least the recommendations of the Committee on the subject of the treatment of enemy and aliens in commercial and industrial occupations.

Important commercial and industrial interests are represented on the Committee, and although a large measure of agreement has been arrived at, several members have signed the Report with specific reservations.

The Report is one of the most important and interesting documents yet published, as a result of the commercial upheaval brought about as a direct consequence of the war.

A CHANGE OF ADDRESS.

Attention is drawn to the removal of the offices of the Meerlo Engineering Co., Ltd., to 199, Piccadilly, W.1. The new telephone number is Regent 1394. The change has been made necessary by the need to devote all the space at the works to production, which has now reached a very high mark, both as regard quantity and quality.

Although at the present time work is going forward at very high pressure, it is hoped that output may be improved still further, and inquiries for A.G.S. nuts and bolts are therefore solicited. Prompt deliveries, thorough workmanship, and attention to detail are guaranteed by Mr. John Meerlo, jun., the managing director of the company, who devotes personal attention to every order.

It is beyond dispute that aircraft manufacturers who make a practice of ordering all their small stuff from specialists increase to a considerable degree the quality and quantity in their output of complete aeroplanes.

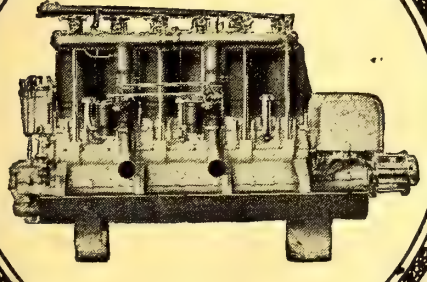


ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:-. ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

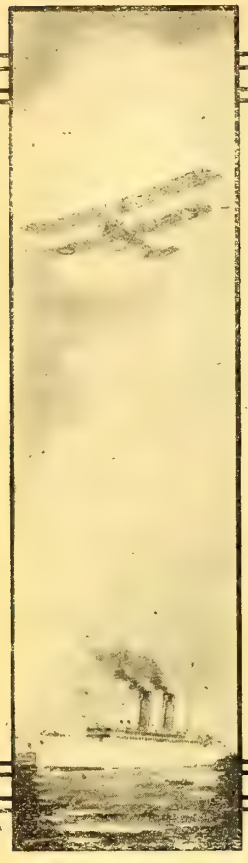
BEARDMORE AERO ENGINE



The Name which guarantees EFFICIENCY and advanced design.

The BEARDMORE AERO ENGINE Ltd.
London Showrooms and Depots:
118, Gt. Portland Street, London, W.1.
Telephone: Gerrard 238.

C.D.C.



Allen's STEELS for AIRCRAFT AND MOTOR CAR CONSTRUCTION

For uniform Results

ASCERTAIN by test the exact heats for your particular purpose. Furnaces and Pyrometers vary considerably. Use as a guide the figures in our

Catalogue D. (Aeroplane and Motor Steels),
Post Free on Request,

but treat a few test pieces and examine carefully for results.

Our Research Laboratory will always advise, or send an expert demonstrator in case of need.



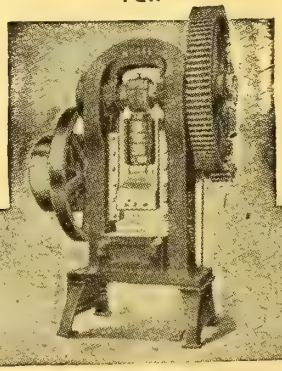
Edgar Allen & Co. Ltd.
Sheffield.

BLISS

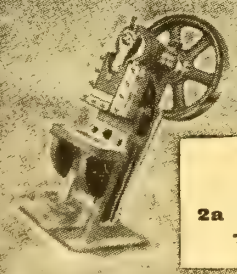
PRESSES & DIES FOR STAMPINGS

AEROPLANE

SEND YOUR STAMPING PROPOSITIONS TO US.



WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.





WRITE TO
E. W. BLISS CO.,
2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1
TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."

(*Continued from page* 1790.)

AIR FORCE.

Reported May 9th.

KILLED.—Davies, Sec. Lt. N. P., R.A.F.
Deacon, Sec. Lt. E. C. W., Yorks L.I., attd. R.A.F.
Harker, Sec. Lt. E. K., R.G.A. (S.R.), attd. R.A.F.
Mildmay, Sec. Lt. B. W. St. J., Gen. List and R.A.F.
Simpson, Sec. Lt. A. L., Gen. List and R.A.F.
Stoddart, Sec. Lt. G. B. J., Gen. List and R.A.F
Thompson, Flt. Lt. E. B., R.A.F.

WOUNDED.—Bannatyne, Lt. A. M., R.A.F.; Collier, Sec Lt. J., Gen. List and R.A.F.; Forsyth, Capt. W. A., R.F.A. and R.A.F.; Hibbs, Sec. Lt. A. S., Gen. List and R.A.F.; Musson, Lt. E. C., Essex R., attd. R.A.F.; Rider, Sec. Lt. J. F. V., Lovat's Scts. (T.F.) and R.A.F.; Ward, Sec. Lt. B. C. M., E. Surr. R., attd. R.A.F.

MISSING.—Coward, Sec. Lt. J. B., Gen. List and R.A.F.; Crawford, Capt. K., Gen. List and R.A.F.; Hill, Sec. Lt. T. R. V., Gen. List and R.A.F.; Mather, Sec. Lt. E., Gen. List and R.A.F.; Nolan, Sec. Lt. P. J., R.F.A. and R.A.F.

Reported May 10th.

KILLED.—Denison, Sec. Lt. J., R.A.F.
Dingwall, Sec. Lt. J. D., Gen. List and R.A.F.
Goswell, Sec. Lt. L., Gen. List and R.A.F.
Homan, Sec. Lt. H. B., Gen. List and R.A.F.
Jones, Lt. B. H. M., R.A.F.
Mogridge, Sec. Lt. L., L'pool R. (T.) and R.A.F.

WOUNDED.—Burney Cumming, Sec. Lt. J. C., Gord. Highrs. and R.A.F.; Gilliat, Lt. E. V., W. Yorks R. (S.R.), attd. R.A.F; Jewkes, Sec. Lt. J. L., Gen. List and R.A.F.; Jolly, Lt. L., R.A.F.; Knocker, Sec. Lt. G. M., R.G.A. and R.A.F.; Leach, Sec. Lt. A., British W.I. Regt., attd. R.A.F.; Lockett, Sec. Lt. C., R.A.F.; Sharp, Sec. Lt. J. E., Gen. List and R.A.F.; Stock, Sec. Lt. E. E., Gen. List and R.A.F.; Uttley, Lt. H. R., Gen. List and R.A.F.; Varley, Sec. Lt. E. R. Gen. List and R.A.F.; Willsie, Sec. Lt. F. S., Gen. List and R.A.F.

ACCIDENTALLY INJURED.—Doe, Sec. Lt. J. E., Gen. List and R.A.F.; Lansdowne, Flt. Sub-Lt. N., R.A.F.; Philbrick, Flt. Sub-Lt. J. E., R.A.F.; Topping, Sec. Lt. V., Gen. List and R.A.F.

MISSING.—Arnot, Sec. Lt. A. A. McD., Gen. List and R.A.F.; Dean, Sec. Lt. H., Gen. List and R.A.F.; Inman, Sec. Lt. H., Manch. R. (T.F.) and R.A.F.; Jones, Sec. Lt. E. D., Gen. List and R.A.F.; Lawson, Sec. Lt. R. G., Gen. List and R.A.F.; MacNair, Sec. Lt. I., Gen. List and R.A.F.; Newton, Sec. Lt. R. F., Gen. List and R.A.F.; Walker, Sec. Lt. J. Q. F., Gen. List, attd. R.A.F.; Winkley, Sec. Lt. S. H., Gen. List and R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER.—Wingate-Gray, Lt. A. G., Gen. List and R.A.F.

ACCIDENTALLY KILLED.—Booth, Sec. Lt. E. B., R.A.F. (S.R.); Craigie, Sec. Lt. V. R., Gen. List and R.A.F.
Pattison, Lt. C. E., R.A.F.
Tucker, Sec. Lt. H. G., Gen. List and R.A.F.

Reported May 11th.

KILLED.—Barradell, Sec. Lt. H. L., Gen. List and R.A.F.
Hughes, Sec. Lt. H., Gen. List and R.A.F.
Jones, Capt. T. B., Gen. List and R.A.F.
Leith, Sec. Lt. S., Gen. List and R.A.F.
Liddell, Sec. Lt. J. G., Gen. List and R.A.F
Macrae, Capt. J. N., Gen. List and R.A.F.

WOUNDED.—Bellin, Sec. Lt. G. W., Gen. List and R.A.F.; Brown, Lt. W. A., Northd. Fus., and R.A.F.; Bundock, Sec. Lt. W. H., Gen. List and R.A.F.; Campbell, Lt. C. H. N. R.A.F.; Cameron, Sec. Lt. R. E. C., R.A.F.; James, Sec. Lt. C. D., Gen. List and R.A.F.

MISSING.—Gerson, Sec. Lt. L. M., Gen. List and R.A.F.; McKelvey, Lt. M. T., R.A.F.; Murray, Sec. Lt. G. L., Gen. List and R.A.F.; Pell, Sec. Lt. W. A., Gen. List and R.A.F.; Westophen, Sec. Lt. P. C., Gen. List and R.A.F.

Reported May 13th.

KILLED.—Doughty, Sec. Lt. E. A., Gen. List and R.A.F.
Duerdon, Sec. Lt. G., Loyal N. Lanc. and R.A.F.
Evans, Sec. Lt. G. W., R. Welsh Fus. and R.A.F.
Hield, Sec. Lt. W. C., Gen. List and R.A.F.
James, Sec. Lt. C. W., Gen. List and R.A.F.
Latham.—Sec. Lt. J. H. V., Gen. List and R.A.F.

WOUNDED.—Crecine, Sec. Lt. B. S., Gen. List and R.A.F.; de Bathe, Lt. H. M., Gen. List and R.A.F.; Mason, Sec. Lt. C. A., Gen. List and R.A.F.; Nye, Sec. Lt. A. C., Gen. List and R.A.F.; Pilcher, Sec. Lt. C. R., R.E., attd. R.A.F.; Richardson, Sec. Lt. D. B., Yorks R. and R.A.F.; Tate, Sec. Lt. J. C., Gen. List and R.A.F.

MISSING.—Elliott, Lt. D., Bord. R. and R.A.F.; Korslund, Sec. Lt. M. F., Gen. List and R.A.F.; MacLean, Capt. A. M. Sco. Horse (T.F.) and R.A.F.; Pemberton, Sec. Lt. A. L., Gen. List and R.A.F.; Wright, Sec. Lt. F. B., R.F.A. (T.) and R.A.F.

Reported May 14th.

KILLED.—Achurch, Sec. Lt. H. G., R.A.F.
Allan, Sec. Lt. R., Gen. List and R.A.F.
Bailey, Sec. Lt. F. C., Gen. List and R.A.F.
Gaster, Sec. Lt. P. S., Gen. List and R.A.F.
Murphy, Capt. H. E., R. Fus., attd. R.A.F.
Souchotte, Sec. Lt. C., Gen. List and R.A.F.
Walters, Sec. Lt. H. A., Gen. List and R.A.F.

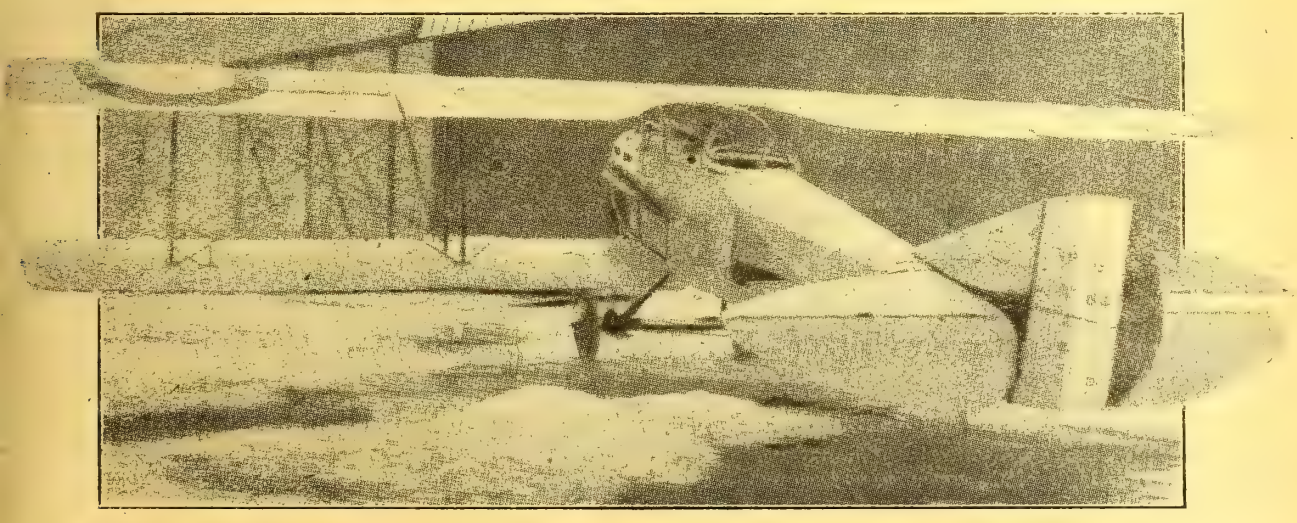
WOUNDED.—Gordon, Sec. Lt. D. W., Gen. List and R.A.F.; Parren, Sec. Lt. J. L., Gen. List and R.A.F.; Squires, Lt. A. A. P., R.A.F.; White, Sec. Lt. C. S., Gen. List and R.A.F.; White, Sec. Lt. J. T., Sher. For. (T.F.) and R.A.F.

MISSING.—Howe, Sec. Lt. T. S., Gen. List and R.A.F.; Lloyd, Sec. Lt. C. C., Gen. List and R.A.F.; Naylor, Sec. Lt. W., Gen. List and R.A.F.; Patrick, Lt. W. D., Gen. List and R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS.—Hanna, Sec. Lt. A. S., Gen. List and R.A.F.
Shreeve, Sec. Lt. F. D., Gen. List and R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED WOUNDED AND PRISONER.—McPherson, Sec. Lt. B., Gen. List and R.A.F.

PRISONERS.—Adams, Sec. Lt. R. G. H., Gen. List and R.A.F.
Beaumont, Sec. Lt. F., Gen. List and R.A.F.
Dugan, Sec. Lt. H. G., Gen. List and R.A.F.
Gold, Sec. Lt. D. G., Gen. List and R.A.F.
Hopgood, Sec. Lt. F. J., Gen. List and R.A.F.
Knapp, Sec. Lt. F. R., Gen. List and R.A.F.
Lomax, Sec. Lt. A. K., Gen. List and R.A.F.
Miller, Lt. A. W., R.E. (T.F.), attd. R.A.F.
Peiler, Sec. Lt. M. F., Gen. List and R.A.F.
Smithers, Sec. Lt. E. L., Gen. List and R.A.F.



Reproduced from "Flugsport."

Rear View of a Spad Two-seater—a somewhat uncommon machine, the more familiar Spads being single-seaters.

PERSONAL NOTICES.

NAVAL.

Death.

LUPTON.—Capt. Charles Roger Lupton, D.S.C., R.A.F., who was killed on May 9th, was the only son of Charles and Katharine Lupton, of Carr Head, Roundhay, Leeds. He was 19 years of age.

MILITARY.

Deaths.

BAIRD.—At an inquest in Essex, on May 11th, on Sec. Lt. John Donald Baird, D.S.O., M.C., R.A.F., aged 20, of Prestwick, Scotland, evidence was given that when taking part in a manœuvre at a height of 6,000 ft. the officer's machine fell. He was killed instantly. It was stated that Mr. Baird was an experienced aviator.

BOARDMAN.—Sec. Lt. Alec Gilmour Boardman, R.F.C., who was killed on April 29th in an aeroplane accident on Salisbury Plain, was the son of Mr. and Mrs. John A. Boardman, of Hadley, Woodford Green. He was 18 years of age.

BROWNE.—Lt. Harold Johnston Browne, R.F.C., who was killed in action on May 3rd, in his nineteenth year, was the eldest son of Mr. Harold Browne, of 3, Fairfax Road, South Hampstead, and 163, Queen Victoria Street, E.C. He was educated at Trinity School, New York, Dumpton House, near Broadstairs, the Royal Naval College, Osborne, and Clifton College, showing considerable ability in boxing, cricket, football and all sports. He entered the R.F.C. as a cadet on July 25th, 1917, and was promoted to 1st Lt. R.A.F. a few days before his death. A brother officer, eye-witness, writes: "I pen these few lines *re* the death of Lt. H. J. Browne and his observer, O. Lt. L. J. Derrick, who fell just in front of our support lines. They were attacked by about six enemy aeroplanes very high up and unfortunately were forced to descend in flames. They appeared to be making great efforts by spiral nose-dive to get to earth before the flames overtook their position in the 'plane, but were unsuccessful as the wings appeared to close and collapse in the body; and then, seeing something had to be done, they appear to have made a jump for life. . . ."

HARGRAVE.—Sec. Lt. W. G. Hargrave, R.A.F., who was killed in Italy on April 25th-26th, was the second son of the late C. S. Major Hargrave, R.E. Born in 1891 he was serving in his father's corps in South Africa on the outbreak of war, and had completed about twelve years' service. He served in German South-West and subsequently in German East Africa, contracting malaria and blackwater fever in the latter campaign. Proceeding to Cape Town when convalescent he was sent home to take up a commission in the Royal Flying Corps, and was gazetted last August. His C.O. writes to his sisters:—"He put up one of the best shows yet done on this front. For half an hour he fought with seven enemy machines, and it is believed brought down three, though up to the present I have only been able to confirm one, and am doing all in my power to claim the other two."

HEPWORTH.—Lt. Arthur Montagu Hepworth, M.C., The Queen's, attd. R.A.F., who was killed in action on May 4th, was 31 years of age, and youngest son of the late Montagu Hepworth and of Mrs. Hepworth, of Hedsor Priory, Bourne End. He had his commission in the Queen's in January, 1915, and was promoted to lieutenant in June, 1916, before which he had been appointed acting captain.

HERRON.—Kenneth Chester Herron, Essex Yeo., whose death was announced recently, was hit by a rifle bullet while flying low over the German lines at Villers-Bretonneux, and died almost immediately. His pilot was uninjured, and flew back to the nearest British ambulance, so that he did not fall into the hands of the enemy.

KEARNEY.—Lt. Norman Charles Kearney, R.A.F. (late East Surrey Regt. and R.F.C.), was killed at Andover, Hants, on Saturday, April 27th. Mr. Kearney had just left the ground when apparently engine trouble developed. The machine stalled when fifty feet from the ground and nose-dived to earth. Death was instantaneous. The machine caught fire and was completely destroyed, but owing to the promptness of Major Joy, who rushed to the spot, his body was rescued.

Mr. Kearney was 26 years of age and was the son of the Rev. N. C. Kearney, M.A., of Geelong, Austratia, and Wimbledon, and the younger brother of Mr. E. C. Kearney, the inventor of the "Kearney" High Speed Mono Rail System. He was married in December, 1915, to Frances, the youngest daughter of Mr. and Mrs. W. Howes, of Mill Hill Road, Norwich.

He enlisted in the East Surrey Regiment in February, 1916. He was in the first Battle of the Somme and was wounded at Guillemont on September 3rd, 1916. Later he received a commission in the R.F.C., in which he was regarded as a first-class pilot, and had recently been recommended for the post of pilot-instructor. He leaves a widow and one child of three months.

MOORE.—Lt. Clive Goulding Moore, 22nd Royal Fusiliers and R.F.C., who has been missing since Aug. 15th, 1917, is now reported killed whilst flying on that date. He was the eldest son of Robert Ernest Moore, of 3, Temple Gardens, and 42, Acacia Road, and Hilda Mary Moore. He was 21 years of age.

MUCKLOW.—Edward Gerald Mucklow, R.F.C., who was accidentally killed on April 22nd while night flying, was the son of the late Walter Mucklow, of Bury and Grange-over-Sands, and Ada Mucklow, Elton, Storrs Park, Windermere. He had been flying on active service for over 14 months.

TATE.—Lt. Alan C. R. Tate, R.A.F., killed on May 2nd, whilst on an offensive patrol, aged 22, was the elder son of Colonel Alan E. Tate, C.M.G., A.D.M.S., Quetta, and Mrs. Tate, 26, Wimborne Road, Bournemouth. He was educated at Charterhouse and Stonyhurst. He was debarred by the results of an accident, which permanently lamed him, from serving in the Army at the outbreak of the war, but for a year he was an orderly under the Croix Rouge in France. In June, 1917, he entered the Royal Flying Corps as a cadet, graduating as pilot early in the present year. In March he joined a squadron at the front.

THORNE.—Lt. Arthur Burrell Thorne, R.F.A., attd. R.A.F., who died on May 8th as a result of a flying accident whilst engaged in training pupils, was the husband of Katharine Thorne (née Thursby) and the second son of Maj. Frederick Gordon Thorne, Norfolk Regt., and Mrs. Thorne, of Heacham, Norfolk. He was 23 years of age.

TYSON.—Major Eric James Tyson, D.S.O., M.C., R.F.C., died of wounds received on March 11th. He was educated at Westminster, and on leaving school entered the motor business. Immediately at the outbreak of war he enlisted in the A.S.C. (M.T.), and was all through the retreat from Mons. Later he transferred to the R.F.C., where his promotion was rapid. He was awarded the M.C. and mentioned in despatches, and subsequently acted as flying officer and instructor on home service. In 1917 he was awarded the D.S.O. for repeated meritorious service and conspicuous gallantry in the air. His Brigadier General says:—"He was the finest flier, the best squadron commander, and one of the pluckiest men I have known, and, personally, I could have spared anybody better than him at this critical time." His Colonel writes: "As his commanding officer, I cannot hesitate from saying that your son was one of the finest and bravest characters which it has ever been my fortune to meet during the whole course of my service. As a squadron commander he was without an equal, and by his personal example and cool courage his squadron has reached a most remarkable state of efficiency. The decorations which he wore, the D.S.O., and the M.C., hardly bear witness to all he has done for his country." Another Commanding Officer writes: "I use no language of exaggeration when I state that your son was, in my opinion, one of the very bravest and most dashing pilots that I have met with during the whole course of my experience. His rule of life was simple, and always explicitly followed, viz., never to ask a subordinate to do anything which he wouldn't and couldn't do himself. I think this rule was the secret of his greatness as a leader, and supplies the reason why he was so beloved by everyone in the squadrons in which he served." Maj. Tyson, who was born in 1892, was the only son of Mr. Joseph Tyson, Bursar of Westminster School. He leaves a widow and a baby son.

WHALLEY.—Walter Gilbert Whalley, R.A.F., late Canadian Infantry, who was killed whilst flying at Duxford on April 27th, was the husband of Eleanor A. Whalley, of Oxford, and youngest son of the late C. G. C. Whalley and of Mrs. Rothwell Garnett, of South Vancouver, B.C. He was 32 years of age.

Engagement.

REISS—WHITEHURST.—The engagement is announced of Peter Quentin Reiss, Lancashire Fusiliers, attd. R.A.F., son of Mr. and Mrs. Henry J. Reiss, of Holmes Chapel, Cheshire, and Vivian, younger daughter of Mr. and Mrs. Whitehurst, of Farnborough, Berkshire.

Births.

BAINES.—On May 6th, at 18, Holland Park, W., to Flora (*née* Allatini), wife of Capt. M. T. Baines, Yeomanry and R.F.C.—a daughter.

MACPHERSON.—On April 26th, at Cooling Rectory, Rochester, the wife (née Joan Howell) of Major C. E. H. C. Macpherson, Royal Dublin Fus., attd. R.A.F.—of a daughter (Nancey Jean).

MINCHIN.—On May 6th, at Bedford, the wife of Captain H. Cotton Minchin, The Cameronians and R.A.F.—of a son.

AIR FORCE.

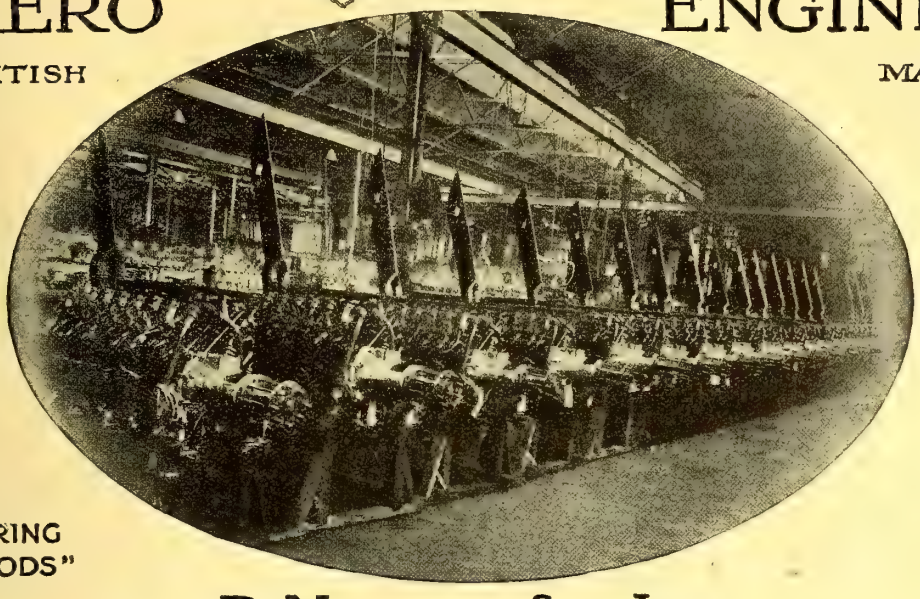
Deaths.

BELL.—Sec. Lt. Benedict Godfrey Allen Bell, R.A.F., fourth son of Canon J. Allen Bell, vicar of Wimbledon, was killed on April 7th. Born in 1891, he was educated at Bowden House School and at Shrewsbury. In 1912 he went out to Singapore. After having made several unsuccessful applications for leave, he resigned his appointment, and reached home in

NAPIER

AERO ENGINES

BRITISH MADE



"DELIVERING THE GOODS"

D. NAPIER & SON LTD.

MOTORS

14 NEW BURLINGTON ST LONDON W.

TAPS & DIES from LONDON STOCK

GUARANTEED TO PASS A.I.D. INSPECTION.

We specialize in Taps and Dies for Aircraft, and can supply hand or machine taps and dies of following threads from stock :—

BRITISH STANDARD FINE -	R/H $^{3}/_{16}$" to $^{3}/_{8}$". L/H $^{1}/_{4}$" to $^{3}/_{8}$".
BRITISH ASSOCIATION - - -	R/H Nos. 0 to 12. L/H Nos. 2 & 4.
SYSTEME INTERNATIONAL - -	R/H $2^{m}/_{m}$ to $20^{m}/_{m}$. ALL SPECIAL PITCHES FOR ENGINE WORK.
WHITWORTH STANDARD - -	R/H $^{1}/_{8}$" to 1".
LOWENHERZ STANDARD - -	R/H $2^{m}/_{m}$ to $6^{m}/_{m}$.

SEND FOR MONTHLY STOCK LIST.

T. L. CASTLE, 2, Cricklewood Broadway, London, N.W.2

Telegrams : SKRUSADYS, PHONE, LONDON. Telephone: HAMPSTEAD 2699.

March, 1917. He joined the R.A.F. immediately, and went out to the front last January.

BENSON.—Sec. Lt. Reginald Charles Benson, R.A.F., who was accidentally killed whilst flying on May 11th, was the husband of Madeleine Benson, The Lodge, Harmondsworth, Middlesex. He was 24 years of age.

COHEN.—Sec. Lt. Benjamin Cohen, R.A.S., met his death while flying at Montrose on May 8th, owing to his machine taking a nose-dive to earth. He was 23 years of age, and a native of Montreal.

DAVIES.—At a Norfolk inquest on May 8th a verdict of accidental death was returned on the body of Sec. Lt. R. L. J. Davies, an instructor who, while practising diving at a target ground, was killed through his machine crashing to earth.

GIRDLESTONE.—Lt. Horace Wilfred Girdlestone, R.A.F., who was killed in action on April 30th, was the son of the late Henry Girdlestone, Cape Town.

HOPKINS.—While flying near an Essex aerodrome Lt. Harry Lynn Hopkins, R.A.F., fell with his machine, which appeared to stall. He was removed to a convalescent hospital near by, where it was found that he was dead.

JAMES, NASH and WARD.—Capt. Bertram James, R.A.F., Lt. Gordon Nash, R.A.F., and Lt. James Gordon Ward, R.A.F., were killed in a collision between two aeroplanes which occurred at Dartford on May 7th.

The accident was witnessed by a large number of people, as the machines involved had been performing evolutions over the town for some time. Shortly before eight o'clock the machines were seen to crash into each other, and one came down in a spinning nose-dive to the earth.

Mr. Nash lived at St. Paul's Cray, not far from the scene of the accident.

Capt. Bertram James, R.A.F., was the son of Mrs. J. C. James, of Semaphore, South Australia. He was 22 years of age.

LE FEUVRE.—Sec. Lt. W. E. Le Feuvre, R.A.F., was engaged on instruction when the machine crashed into the aerodrome, causing his instantaneous death. He was 29 years of age.

LOWRIE.—Lt. Victor William Valette Lowrie, R.A.F., who died as the result of an aeroplane accident on April 27th, aged 18, was the only son of Mr. and Mrs. Alfred Lowrie, of Lynwood, Radyr, Glamorgan. He was educated at the Llandaff Cathedral School and afterwards at Clifton College, where he held the School Racquets Championship. Last August he joined the Air Service, obtained his wings in record time, and became an instructor.

LUTYENS and PINSENT.—Whilst being tested over Surrey, on May 8th, an aeroplane collapsed in mid-air and fell to earth in five sections. The pilot, Lt. Lionel Derek Francis Lutyens, R.A.F., and a civilian passenger, Mr. David Hugh Pinsent, were killed. Mr. Pinsent's body is believed to have fallen into a lake. Lt. Lionel Derek Francis Lutyens, R.A.F., was the son of Mr. and Mrs. Lionel Lutyens, of 26, Queen Anne's Grove, Bedford Park, W. He was 23 years of age.

At the inquest on Mr. Lutyens on May 11th no evidence was forthcoming as to the cause of the accident, and a verdict of accidental death was returned. It was stated that though diligent search had been made by the police and by 1,200 soldiers of the London Regt., and though a canal had been dragged, no trace had been discovered of the body of the civilian observer, Mr. Pinsent, who was flying with Mr. Lutyens at the time of the accident. An Army sergeant stated that the aeroplane was flying at a tremendous height when it suddenly broke into five parts, which came crashing to earth. He at once ran to the wreckage, where he saw Mr. Lutyens dead, but he saw nothing of Mr. Pinsent.

David Hume Pinsent, B.A., Royal Aircraft Establishment, Farnborough, was the only surviving son of Mr. and Mrs. Hume C. Pinsent, of Foxcombe Hill, near Oxford, and Birmingham He was 26 years of age.

NASH.—Sec. Lt. Gordon Nash, R.A.F., who was accidentally killed on May 7th while flying, was the younger son of the late W. G. Nash and Mrs. Nash, of Crayfield, St. Paul's Cray, Kent.

THORNE.—Lt. Arthur Burrell Thorne, R.A.F., who died on May 8th as the result of a flying accident, which occurred while instructing pupils, was the husband of Katharine Thorne (née Thursby) and the second son of Maj. Frederick Gordon Thorne, Norfolk Regt., and Mrs. Thorne, of Heacham, Norfolk. He was 23 years of age.

WAIT.—Cadet William Winslow Wait, R.A.F., a Canadian, who was in an aeroplane which nose-dived into Elstree Reservoir on May 11th, was drowned. He was 26 years of age

* * *

SPINK.—On May 4th, at the Princess Christian Nursing Home, Windsor, Evelyn, dearly loved only child of Capt. Herbert Spink, R.A.F., of Broadwater, Wraysbury, Bucks, aged eight years.

Engagements.

HAY—LIDDELL.—The marriage arranged between Capt. J. C. M. Hay, R.A.F., and Miss M. Monica Liddell will take place on Thursday, May 16th, at 2.30, at St. Mary's, Cadogan Gardens. No invitations will be sent, but all friends will be welcome at the church, and afterwards at 20, Hans Crescent.

HUGHES-CHAMBERLAIN—SMART.—An engagement is announced, and a marriage will shortly take place, between Capt. R. Hughes-Chamberlain, R.A.F., son of Mr. R. C. Hughes-Chamberlain, late J.P., Nottingham Road, Natal, and Muriel, only child of Mrs. F. B. Smart, of Montagu Mansions, London.

Marriages.

JONES—BUCKNALL.—On April 20th, at St. George's, Bloomsbury, Capt. John Hugh Oscar Jones, R.A.F., was married to Charlotte Margaret Georgina, elder daughter of the late John Loyd and Mrs. Bucknall, of Marlborough, by the Rev. L. A. Smith, Vicar of Blayford and Rural Dean.

SWAIN—McNALLY.—On April 27th, at St. Mary's, Bury St. Edmunds, Frank Lawrence Swain, R.A.F., younger son of Frank Swain, of Sidcup, Kent, was married to Dorothea Olive, only daughter of J. F. McNally, of St. Peter Port, Guernsey, by the Rev. C. R. Farnsworth.

WALSH—SCARFE.—On May 9th, at St. Mary's Church, Finchley, Sec. Lt. George Cecil Walsh, R.A.F., son of the late Mr. C. F. Walsh and of Mrs. Walsh, 6, Regent's Park Road, Finchley, was married to Laura, daughter of the late Mr. F. N. Scarfe and of Mrs. Scarfe, Fursby House, Nether Street, Finchley, by the Rev. W. St. Hill-Bourne, Rector, assisted by the Rev. George Vasey, Vicar of St. Michael's, Brunswick Park.

Births.

COX.—On May 4th, at 24, Bath Road, Reading, to Eileen, wife of Major G. H. Cox, R.A.F.—a daughter.

HODGES.—On May 7th, 1918, at 17, Craven Road, Harlesden, to Dorothy, wife of Capt. J. S. Hodges, R.A.F.—a daughter.

LANGLEY.—On April 30th, at 13, Foster Road, Gosport, Hants, to Lorna (née Lodge), the wife of Lt. J. B. Robert Langley, R.A.F., of a son.

ROGERS.—On May 5th, the wife of Capt. Tanner M. Rogers, R.A.F., The Hollies, Kenilworth—of a son.

TRAVERS.—On May 10th, 1918, at Mole Cottage, Westhumble, Dorking, the wife of Major Benjamin Travers, R.A.F.—of a daughter.

FOREIGN COMMUNIQUES.

FRANCE.

May 7th.—During May 6th four German aeroplanes were brought down by our pilots in aerial combats and two were seen to fall in a damaged condition in their own lines.

During the same day our bombarding aeroplanes dropped four and a half tons of bombs on the railway stations of Flaville-Martel, Mennessis, Ham, Guiscard, Noyon, and Vermand.

May 10th.—Lt. Fonck, during two patrol flights yesterday, brought down six German biplanes—the first two in ten seconds, the third five minutes afterwards, and the last three in the course of his second patrol.

May 10th.—Army of the Orient.—Aircraft activity was intense over the fighting lines and back areas. Four enemy machines were brought down and one forced to land.

May 12th.—On May 10th, in spite of the bad weather, our chasing aeroplanes were active. Two German machines were brought down and eight were badly damaged. On May 11th a German captive balloon was set on fire by our pilots. On May 10th and 11th our bombarders dropped 7,000 kilos (about seven tons) of projectiles on enemy railway stations, dumps, and cantonments, especially in the region of Noyon, Chauny, and Fleury le Martel. At the last-named place several fires were observed.

GERMANY.

May 9th.—In aerial fighting during the last few days, and by our anti-aircraft guns, the enemy lost 37 aeroplanes. Ober-Lt. Schleich brought down yesterday three enemy machines, and thus achieved his 26th, 27th, and 28th aerial victory.

May 9th.—Strong enemy flying squadrons bombed the mole and the village of Zeebrugge at noon and in the evening. No military damage was done.

Two enemy aeroplanes were shot down by our aviators on the land front and another one on the sea.

May 12th.—In aerial fighting, during the last two days, 19 enemy aeroplanes were shot down. Twelve of them were brought down by the fighting squadron formerly led by Baron von Richthofen.

Lt. Loewenhardt gained his 20th and 21st aerial victories.

May 13th.—The losses of enemy aerial forces on the German front during the month of April amounted to 15 captive balloons and 271 aeroplanes, of which 122 fell behind our lines, whilst the others were seen to fall beyond the enemy's positions

During aerial fighting we lost 123 aeroplanes and 14 captive balloons.

ALL-BRITISH

M-L

MAGNETOS

THE main features of "M-L" ALL-BRITISH MAGNETOS are great reduction in size and weight as compared with pre-war magnetos of the same electrical output, effective sparking at very low speeds and strict interchangeability—permitting prompt supply of spares.

The M-L Magneto Synd., Limited
COVENTRY.

At your Service after the War

Where Flying Men are fitted out.

ONE SERVICE



Uniformity of custom and kit; on land, on sea and in the air one organisation only—unity of control centring on one ideal—efficiency. That is the ideal aimed at by the R.A.F. It also summarises the policy of Dunhills; as the R.A.F. have co-ordinated all the efforts and abilities of its two parent services for the better 'strafing' of the Hun so is every idea, every thought and every effort concentrated by the House of Dunhill on the problem of eliminating weather.

The land crab knows nothing of weather inconvenience—it is left to men of the R.A.F., who fight it in its own headquarters, to feel the full fury of its All Highest displeasure.

But Dunhills know and have provided for the worst to the last little detail; and it is just this expert "understanding" knowledge that made them so indispensable to men of the old Air Forces.

The new Force still has the old traditions, the old enemies and now they are one service they still have Dunhills for equipment—the one service that will never fail them.

Call in, if you can, at our well-known "base" in Conduit Street—a few paces from Regent Street—and inspect the full kit. Or, if London is "out of bounds," drop a line for patterns and full details which will be sent gladly on request.

Dunhills

LIMITED.

2, Conduit Street,
Regent Street, London, W. 1.

ITALY.

May 7th.—British aviators shot down three hostile machines in the Motta di Livenza district, and bombed the enemy's rear areas between the Astico and the Brenta.

May 9th.—British aviators bombed the aviation ground at Motta di Livenza.

May 13th.—Naval.—On the morning of May 12th one of our mixed squadrons of seaplanes and aeroplanes effectively bombed the submarine base of Cattaro. Enemy chasing aeroplanes rose in pursuit without result. Notwithstanding intense enemy fire all our machines returned safely.

AUSTRIA.

May 12th.—Field Pilot Senior Lt. Link Crawford on the 11th inst. shot down two English aeroplanes, and thus gained his 22nd and 23rd aerial victories.

BELGIUM.

May 7th.—This morning, after a violent bombardment, a party of the enemy attempted to capture a trench in the region of Nieuport, while enemy aeroplanes fired with machine-guns on our advanced lines and dropped bombs on the town of Nieuport The enemy attempt was unsuccessful.

May 8th.—One of our aviators set fire to two German balloons near Zarren.

An enemy aeroplane was brought down in our lines by one of our machines. It crashed near Westvleteren.

May 9th.—Enemy aeroplanes bombarded several of our cantonments without success. Our aeroplanes were very active during the day.

TURKEY.

May 5th.—West of the Jordan, as the result of an air fight, an enemy aeroplane was brought down in flames.

May 8th.—By a daring surprise attack our troops captured an enemy position south-west of Umm esh Shert.

May 8th.—Our aeroplanes attacked early in the day the enemy's camp near Jericho.

May 10th.—In the coast sector our aviators brought down two machines, which fell in flames.

BULGARIA.

May 4th.—In the Tcherna bend a squadron of German aeroplanes brought down an enemy machine, which fell in front of our positions and was destroyed by our artillery fire.

May 6th.—In the Moglena region and west of the Vardar two enemy aeroplanes were brought down.

May 7th.—East of the Tcherna a German aviator brought down an enemy aeroplane, which fell in flames behind our positions.

SERBIA.

May 9th.—Allied aviators have bombarded the aerodrome at Drama and the cantonments at Beranci.

THE WORK OF THE K.Bs.

The following, presumably official, account was published in the daily newspapers of May 13th :—

It was not until the early months of 1915 that the Kite Balloon division of the R.N.A.S. came into being. When the demand for observation balloons for the Dardanelles operation came through in March of that year the Royal Navy was able to send out a completely equipped Kite Balloon Section in a specially fitted steamer. The vessel, the "Manica," a converted tramp, which arrived just a month after the demand was made, immediately proved the value of the unit. Within three days a Turkish camp was shelled under the direction of the kite balloon, and the occupants thrown into confusion; while in the following week the "spotter" directed fire on the Gaba Tepe position, which resulted in the destruction of the barracks.

However, the triumph came before April was out, for from their aerial perch the observers spotted, lying quietly in the water on the other side of the Peninsula, out of sight of our warships, a large Turkish transport. The transport apparently considered herself quite safe. H.M.S. "Queen Elizabeth" was operating near by the balloon ship, and the bearings of the Turkish vessel were given her. The first shot fell short. By this time the other ships near by were beginning to take an interest in what was happening to "Elizabeth's" invisible target, which was lying nine miles the other side of the Peninsula. A second shot went nearer the mark. Again, the direction was corrected, and a third heavy projectile screamed overland. By the telephone wire of the kite balloon came the words, "Got her. She's sinking by the head." The signalman semaphored this literally to "Queen Elizabeth," and a roar of laughter went up as the various ships read the laconic message.

Repeated attacks were made by the Turks on the solitary kite balloon and her parent ship, but they were fought back. The effect on the Turkish shipping was evident, for whenever the "Manica's" offspring ascended, the enemy craft, remembering the fate of the transport, hustled off out of range of our big guns. The official record of the "Manica" for the next fortnight was as follows :—

April 28th.—Two field batteries silenced; several guns destroyed.

April 30th.—Chanak shelled; burned for two hours.

May 2nd.—Battery of 8-inch guns shelled; three direct hits.

May 8th.—Four batteries silenced.

May 12th.—House, reported to be Turkish Headquarters, destroyed.

This and other work was a wonderful tribute to the efficacy of the new observation contrivance, and it should be remembered that barely two months before there was not a single kite balloon in England, and that the whole of the section was in an embryonic state. The experience gained in the "Manica" was the foundation of what is now an active branch of the Royal Navy.

[The history of how the K.B. came to be adopted at all, despite official opposition, is a matter of internal history, to be told after the decease of D.O.R.A.—Ed.]



A Series of Official Photographs of the Sablon Station at Metz showing the results of a bombing raid.



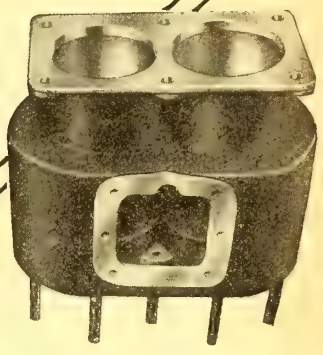
"The best job I have ever had done"

This is what the man to whom these agricultural tractor engine cylinders belonged said, when he came to collect his repair. This is what everyone either thinks or says about the job he sends to :—

THE NEW WELDING Co.

Ask any Engineer

in your neighbourhood where he sends his welding repairs, and send yours to where ninety-nine out of every hundred send theirs—THE NEW WELDING CO. The Engineer has proved for himself that there is no repair service in the country where he can obtain a better job, at a more reasonable price, or in quicker time.



THE NEW WELDING Co., 26, Rosebery Av., London, E.C.1.
Telephone: 5252 Holborn. Telegrams: "Windoneeda, Holb, London."

PRACTICAL FLYING

3/9 Net

COMPLETE COURSE of FLYING INSTRUCTION
By a FLIGHT COMMANDER.



THE FIRST PRACTICAL WORK on actual TRAINING and INSTRUCTION for the R.A.F. Written and illustrated by practical Flying Officers who have had considerable experience as instructors under Service conditions.

With an Introduction by Major-General W. S. BRANCKER, R.A.F.

OVER 100 ILLUSTRATIONS, Diagrams, etc. Special Pull-out Map, illustrating a Cross-Country Flight.

The following subjects are covered :

THE theory and practice of flight —Principles of aeroplane engines —The first lesson in the air—The first solo flight and aerodrome practice—The use and working of the instruments—Map reading (illustrated with special Ordnance Survey Maps)—Preparing for a cross-country flight — Cross-country flying — Advanced flying — Night flying, etc.

Everyone who takes an interest in Aviation will find in this work a very clear exposition of why an aeroplane flies, how it is flown, and the manipulation to produce apparently difficult "stunts."

ON SALE THIS WEEK.

Obtainable through any Booksellers; or post free from the Publishers 4/- net

TEMPLE PRESS LIMITED, 7-15, Rosebery Avenue, London, E.C.1.

Wholesale: E. J. LARBY, Limited, 30, Paternoster Row, London, E.C. 4.

WAR SERVICE MANUALS — TP LTD

"Practical Flying" is only one of many War Service Manuals. *Write for complete list.*

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AIR WORK ON THE WESTERN FRONT.

The "Times" correspondent writes from the British front on May 10th:—

The few days of fine weather have given our flying men another chance, and, as you know from the official communiqués, they have made good use of it.

German airmen taken prisoner lately say that they are now having great difficulty in replacing the personnel, their Air Force having lost some 700 pilots and observers since the beginning of the offensive on March 21st. One reconnaissance flight alone has lost 130 of its men.

They speak with the greatest admiration of British airmen, but mitigate their compliments by declaring that our machines are better than theirs—all of which is only evidence that their moral is badly shaken.

It is reported that Lt. von Richthofen, brother of the famous flying man recently killed, and who was said to have succeeded to the command of the "circus," has had his skull fractured from a fall of his machine after a fight, and will be unable to fly again.

An extraordinary example of the superior moral and fighting quality of our flying men is given in an incident which occurred three days ago, when on May 7th two of our two-seater fighting machines fell in with a patrol of seven German scouts, and immediately gave battle. While the fight was on, two other enemy patrols of about equal strength hove in sight, and joined in, until there were either 20 or 21 German machines engaged against the two British.

The fight went on for half an hour, in the course of which our two actually shot down eight enemies and sent down others out of control. Of the machines certainly shot down four broke into flames in the air, and four were seen to go straight to earth and crash. Our two only broke off the fight when all their ammunition was exhausted, and then, out of 20 or so Germans originally engaged, only seven were left in the air.

On the following day these same two machines again fell in with a party of the enemy, of whom they shot down one and sent three more down out of control, so that the total "bag" for the two machines in two days was nine machines destroyed and apparently an equal number driven down.

In another case, on May 6th, one British machine gave fight to five Germans, consisting of four triplanes and one scout, and shot down two triplanes and came home safe.

In other ways also the Royal Air Force has been doing splendidly. The co-operation of aeroplanes with artillery and infantry has been magnificent in all kinds of weather, and an

VENUS PENCILS

FOR sketching, topographic maps, mechanical drafting, and all technical uses, military, naval and civil, there is one pencil which is famous as being the standard by which all pencils are judged. This is the VENUS. VENUS pencils are perfect for every purpose. More VENUS' are sold than any other drawing pencil. Quality counts!

Specify VENUS and look for the distinctive VENUS finish.



17 Black degrees from 6 B (softest) to 9 H (hardest), and hard and medium copying.

FREE!

This Trial Box with Five VENUS Drawing Pencils and Venus Eraser sent free!

Please enclose **5d.** in stamps to cover postage and packing.

WRITE FOR IT!



American Lead Pencil Co.
173/5, LOWER CLAPTON ROAD, E.5

Von Richthofen's Own Story.

2/6 net. Post free, 2/9

ILLUSTRATED.

The Red Air Fighter.

BY

CAPTAIN BARON VON RICHTHOFEN.

Von Richthofen's biography, in which he describes his experiences in the war and his air victories, has been translated and annotated for the special benefit of the Flying Services.

It would in any case have been read with profit and interest, but his death at the end of April has made the translation more than ever opportune. Copies of the book will be supplied strictly in rotation of orders received.

Now Ready. 5s. net, 5s. 4d. post free.

Fully Illustrated with Diagrams.

HOW AN AEROPLANE IS BUILT.

By STEPNEY BLAKENEY.

With an Introduction by C. G. Grey.

*** This book contains the articles which appeared in the "Aeroplane" under the title "Construction of Aeroplanes and their Components." They have been thoroughly revised, and are reprinted in response to many requests.

Now Ready. 1s. 6d. net, 1s. 8d. post free.

THE "AEROPLANE" BLUE BOOK.

A DIRECTORY OF AIRCRAFT FINANCE, 1918.

A handy, up-to-date and authoritative reference book on all matters affecting the Directorate, Capital, Accounts, etc., of Aircraft and Kindred Companies.

The "Aeroplane" & General Publishing Co., Ltd.,
12, Bream's Buildings, E.C.

BUY

Your Streamline Wires

FROM

THE ORIGINAL MAKERS

BRUNTONS

MUSSELBURGH,

SCOTLAND.

We can supply Wires, plain, screwed or fitted with Fork or Universal Joints.



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd

The Linen Hall, Regent Street, London, W.

HIGHGATE AIRCRAFT COMPANY LIMITED

NOTE:

Our Engineering Section can supply from stock Pressings for

AW., DH., RE., Etc.

Prompt delivery of Blankings or Fittings of any description guaranteed.

Capstan Work of any size up to 2 in. diameter and heavy Centre Lathe, Milling and Tool Turning undertaken.

QUOTATIONS ON RECEIPT OF DRAWING.

'Phone—2260 HORNSEY.

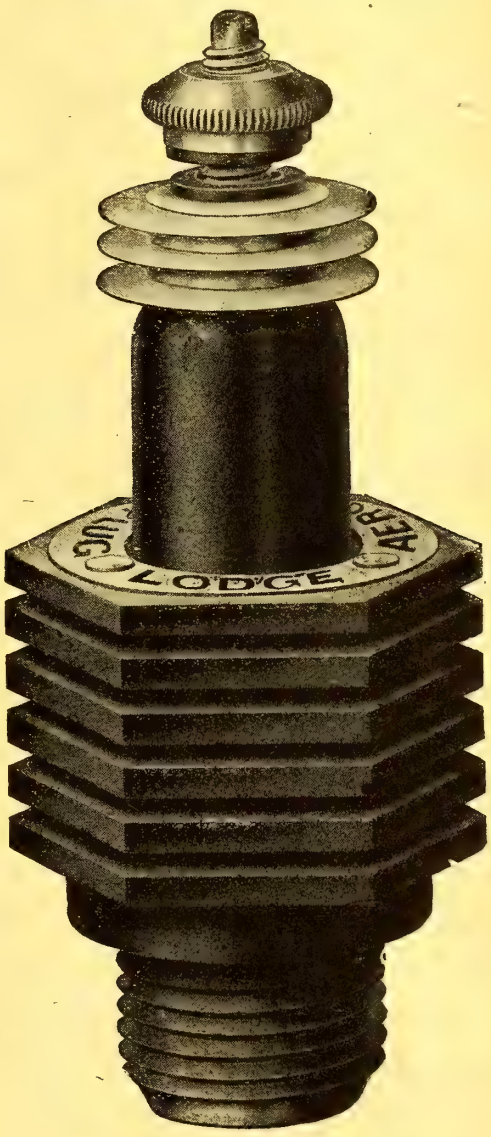
Pauntley St., Archway Road, HIGHGATE, LONDON, N.

No plug has achieved as high a reputation in use in the air under the war's severest tests as

THE

LODGE

AERO PLUG.



S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Illustrated Catalogue on Application.

THE LODGE SPARKING PLUG CO., LTD., RUGBY.

enormous amount of bombing of enemy troops, railways, billets, transport, batteries, and so forth has been done, as well as harassing troops on the roads and in the trenches with machine-gun fire from low down. Prisoners continually tell us of the great damage done, especially by bombing, in the Albert, Bapaume, and Bray areas.

THE WAR IN REVIEW.

La Revanche.

Reuter's correspondent writes from Paris on May 10th :—

The following details are available of the exploit mentioned in this afternoon's communiqué of Lt. Aviator Fonck yesterday. He left in the morning, telling his comrades that he would avenge the death of Lt. Chaput. Shortly after his departure he encountered an enemy formation of which he brought down two machines within ten seconds, and, pursuing another, also sent it to the ground five minutes later. He then returned to his aerodrome, and, after a brief rest, set off again. During his second flight he brought down another three enemy two-seaters in less than five minutes.

Observation Extraordinary.

From the "Daily Express" of May 11th :—

According to Lt. Depret-Bixio, of the French Army, who is a naturalist as well as a flying man, many insects follow captive balloons in their ascent. He has seen flies go as high as 2,970 feet, after which they die. Grasshoppers cling to the basket of the balloon until the air becomes too rarified for them, when they let go and fall. He says the swallows have a glorious time catching these insects.

Italian Notes.

The Hon. E. Chiesa replying in the Upper House to an interrogation on the Air Service on April 30th said that though they now had 150,000 men in the Service, and the experimental and building sides of the organisation were in excellent working order, yet the ideal organic form of the Aeronautical Corps had not been arrived at.

The present arrangement whereby pilots of all ranks still belong to a regiment and are merely attached to the Flying Corps is unsatisfactory. Seniority and such-like thorns are not easily avoided: *e.g.*, men from certain regiments get seniority quicker than those from other regiments.

In the hope of being able to re-organise the aviator officer's military career on a juster basis the Commissary said that the changes only just lately introduced into Allied England's Air Force are being closely watched.

In respect of a certain great and recent loss which aviation here is mourning, it has been hinted in print that the large eight-cylindered engine used has very high compression, early timing, and very advanced ignition. The inference is that the engine might very conceivably set its carburettors ablaze.—T. S. Harvey.

Austro-Ukrainian Aerial Traffic.

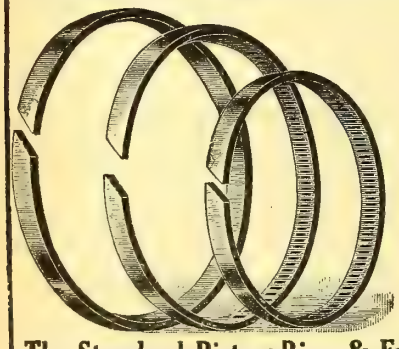
A Reuter message of May 13th states that aerial traffic between Vienna and Kieff appears about to come to an untimely end. "Az Ujsag" (Budapest) quoted by the "Kreuzzeitung," attributes the impending stoppage to the variability of the weather, to the fact that the aeroplanes used too much petrol and also to the improvement in the railway connection between Vienna and Kieff.

The First American Citation.

The "Times" correspondent with the American Army writes on May 6th :—

Sec. Lt. Alonzo M. Seymour, whose home is at Peekskill, New York, was the first American to receive individually the French Army Corps citation with the Croix de Guerre to-day. He is a probationary aeroplane observer. The citation states that he distinguished himself immediately after the arrival

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).

In our Special Piston Ring Iron. All sizes up to 72 in.

Quick Delivery.

Absolutely Reliable.

Low Prices

Telephone No. 2149.
Telegrams—
"Ocean," Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Don Road, Sheffield.

THE POOLE AVIATION CO.
POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

Phone: Poole 54. Grams: Aviation, Poole.

'FEARLESS' ENGINE CLEANING BRUSHES

As used by the R.F.C.



Send Trade Card for FREE SAMPLE.

FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD, LONDON——N.16.

A.G.S. WASHERS

Wire Work.

THIMBLES

Turn Buttons.
Eyelets.
Washers.

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

"ULSTER" FANS

FOR ALL PURPOSES.

Forced and Induced Draft on Boilers. Fumes Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. **Hot-Water. Steam. "Ulster" Stoves.**

We Guarantee Success. Our 50 years' experience is at your disposal.

MUSGRAVE & CO., Ltd.,
Manufacturing Engineers,
BELFAST, LONDON, MANCHESTER, CARDIFF.

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.'.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

Telephone: 1153 and 1154, KINGSTON. **Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.**

Aeroplane Engine Manufacturers–

You can depend on **ALVASTON** perfect **WELDING.**

Pistons, Cylinder Jackets, Intricate Pipe Work, etc., in Steel, Copper, Aluminium, Cast Iron, and Alloys.

Our recently increased Capacity and Twelve Years' Experience are at Your Service.

Quotation to Drawing or Sample. Prompt Deliveries.

ALVASTON WELDING CO., ALVASTON, DERBY.

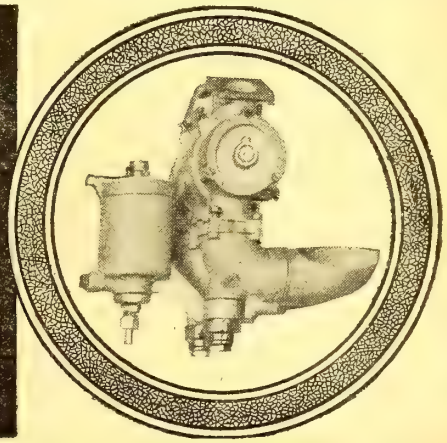
'PHONE—1 ALVASTON. 'GRAMS—"MOTORS, ALVASTON."

Claudel-Hobson

CARBURETTERS

H. M. HOBSON, LIMITED

29, Vauxhall Bridge Road, London, S.W.1



his unit by his daring and quick perception, directing on April 12th a successful service for the Army, despite bad atmospheric conditions and constant attack by enemy anti-aircraft guns, and ably conducting from beginning to end our demolition of a troublesome enemy battery.

[One does not forget that the whole of the old original Lafayette Squadron had the Croix de Guerre, and some of them the Légion d'Honneur a couple of years ago.—Ed.].

The Liberty Engine.

The "Times" correspondent at Washington writes on May 7th as follows:—

There have been bitter attacks on the Liberty engine, but I am in a position to assert, without qualification, that the Liberty engine will give magnificent results when used for the purpose for which it has been designed. One of the great causes of delay has been the desire of the military authorities to attain perfection, instead of being content with an excellent performance. Minor improvements have proved useful, but no essential changes have delayed construction.

[Judging from American reports the puissance of the Liberty engine is about analogous to the "almighty dollar"—in the United States, if nowhere else.—Ed.]

Tactical Operations.

Reuter's Special Service reports from the British Front in France on May 8th as follows:—Fighting continues in fine weather, with good visibility, so that the airmen of both sides are very active, with our own, as usual, rendering splendid service to our artillery in addition to swooping down and engaging the hostile infantry. The tactical objective of the operation would appear to be an attempt to clear the way for a thrust towards the Scherpenberg from the north-east, and it may prove to be but the beginning of further fierce fighting in this region.

A Booby Trap.

The correspondent of Reuter's Special Service with the American Army reports May 7th:—

The "Flying Circus" has been busy all day with tricky tactics. Once an American machine, answering the challenge of a German over the lines, was set upon by four others, which had been "sitting" in the clouds above their companion. Several times our machines on answering challenges have found double the number of Boches reported when they arrived at the spot.

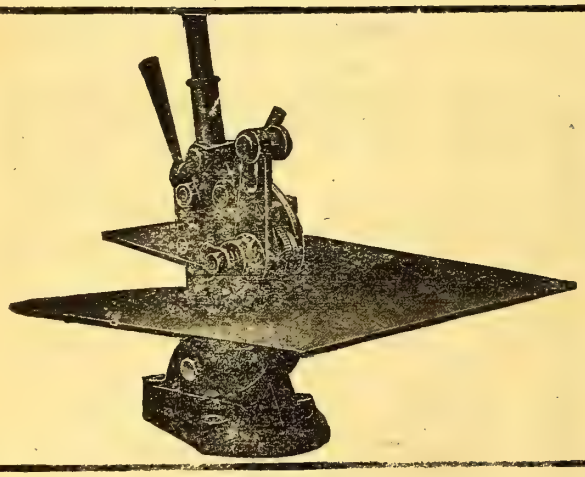
[This "novel trick" dates back to somewhere in 1915.—Ed.]

W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.



'TANGENT'

HAND
SHEET SHEARING MACHINE
PATENT.

SELF-FEEDING, FAST CUTTING
STEEL, 3/16 SOFTER METAL, 1/4.

Write for Descriptive Pamphlet and Prices.

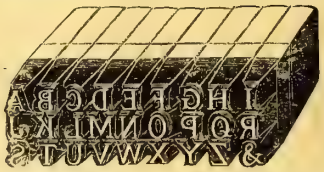
MONTGOMERY, SMITH & Co., Ltd.,
PATENTEES AND MANUFACTURERS,
KEYNSHAM, SOMERSET.

CONTRACTORS TO WAR OFFICE, ADMIRALTY AND AIR BOARD.

'Phone—East 3331 (2 lines). Wires—Dayhur, Phone London.



STEEL



STAMPS



And MARKING ROLLERS for all descriptions of Aircraft Parts

BRANDING IRONS. Inks and
STENCIL PLATES. Brushes.

JOHN MEERLOO & SONS,

CLEVELAND STREET, MILE END, LONDON, E. 1.

From
$\frac{1}{16}$" to $2\frac{5}{8}$"
TERRY'S
have made
Washers.

AND we can supply any pattern in any metal—high grade quality and accurate sizes.

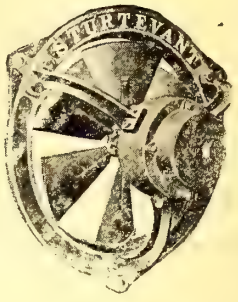
Write us about your War Work orders?

HERBERT TERRY & SONS, Ltd
The Spring and Pr sswork Specialists...Redditch En g.



Dope Room Temperature and Air Change

to conform to Home Office requirements.



Covering Room Conditions

to meet official approval.

Sturtevant Heating and Ventilating Apparatus will give the required conditions. Over 70 Aircraft Factories have been equipped with Sturtevant Plant with entirely sa isfactory results. We shall be pleased to place the services of our Aircraft Department at your disposal to assist you with your require ments in this direction.

Ask for Catalogue W 1063.

Sturtevant
Engineering Co., Ltd.,
147, Queen Victor a St., London, E.C. 4.

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.



FIRST IN 1880 FOREMOST EVER SINCE.

PROMPT DELIVERY AGAINST "A" CERTIFICATE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,
NEW CROSS, LONDON, S.E.

PETROL TANKS SUMPS, BONNETS COWLS, &c.

and other
Light Pressed
& Stamped Work
for Aeroplanes.

JOSEPH SANKEY & SONS, LTD.

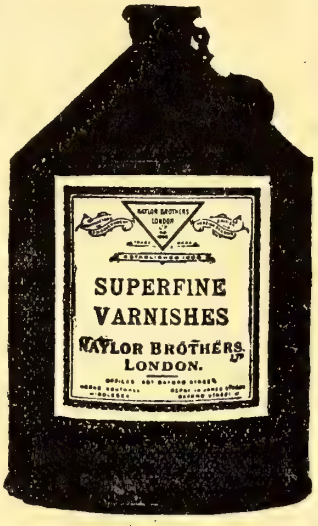
Hadley Castle
WELLINGTON
Shropshire

THE USE OF

NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.
Contractors to all Government Departments.
Offices: 407/9, OXFORD St.,
LONDON, W.

AEROPLANE GENERAL SUNDRIES, LTD.

OWING to an adverse legal decision we are no longer able to use our well-known block embodying the initials of our name———but ———

We can still supply you with

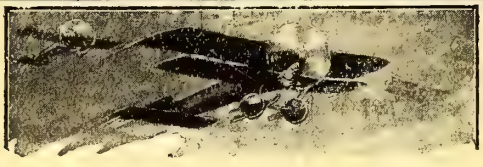
A.G.S. Parts

All kinds of small Turning and Repetition Work carried out at short notice.

Telephone—
Holborn 4959.

Telegrams—
Zeppiskout,
Holborn,
London.

Registered Office—
FULWOOD HOUSE,
FULWOOD PLACE
HIGH HOLBORN,
LONDON, W.C.



Aeroplane Construction

In aeroplane construction the vital factor is "how many machines can be turned out in a given time." This depends entirely upon the efficiency of the machinery employed. And **no** machine reaches its highest point of production until its clutches, brakes, etc., are fitted with Ferodo Fabric.

Ferodo Fabrics are the most efficient transmitters of energy. Leather, wood, textile beltings, etc., are out of date for Friction drives and Braking purposes. The moment they become soaked with oil they are useless; Ferodo Fabrics never slip, never seize; are not affected by water, oil or acid, and are absolutely reliable under all conditions.

THE HERBERT FROOD CO. LTD.
CHAPEL-EN-LE-FRITH.

Contractors to the War Office and Admiralty, London General Omnibus Company, and Underground Electric Railways of London and Paris.

Depots at London, Birmingham, Belfast, Bristol, Cardiff, Edinburgh, Glasgow, Liverpool, Manchester & Newcastle.

FERODO
Friction Surfaces.



Class 5 Imperial Acetylene Welding Plant.

OXY-ACETYLENE PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON,
S.W.1.

Telegrams—
'Edibrac,
Phone,
London.'

Telephone—
Victoria
3540
(3 Lines)

Bowden.

Controls AND Cables FOR Aeroplanes

Suitable for all possible purposes.
Quotations submitted on application.

Nets Address:—

THE BOWDEN BRAKE CO., LTD., TYSELEY, BIRMINGHAM.

Tyseley

B.B.B.

The Guardian Angel Parachute



RELIABILITY First Second All the Time

E. R. Calthrop's Aerial Patents, Ltd.

Eldon St. House, Eldon Street, London, E.C.2

Telephone (2 lines)— London Wall 3266 & 3267.

Telegraphic Address— "Savemalivo, Ave, London."

ELECTRIC CABLES



No. 111A

SPECIAL MAGNETO CABLE

AIR BOARD SPECIFICATIONS.

FLEXIBLES SPECIALLY MADE FOR AERO ENGINES

EST 1901

E. KALKER & CO., COVENTRY.

THE

Eastbourne Aviation Co. LTD.

ESTABLISHED 1911

THE EASTBOURNE AVIATION Co LTD

AEROPLANE CONSTRUCTORS

Contractors to the Admiralty

S·B·A·C THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

TELE { GRAMS: Aircraft / PHONE: 1176 } EASTBOURNE

Bowden Wire Ltd.

TRADE MARK

LONDON

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

Established 1897.

VICTORIA ROAD
WILLESDEN JUNCTION NW10

J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.
104, Criterion Works, Birmingham.

1336

AIRCRAFT DEPARTMENT



THE WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

British Metal (Kingston) Ltd

Kingston-on-Thames

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, De H.
RESIDENT A.I.D. EXAMINER.

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

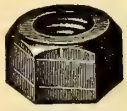
(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅛in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS LTD.
WOLVERHAMPTON.

London Offices: 139/141, CANNON ST., E.C.4.

AEROPLANE



ACCESSORIES

7 Years' Experience.

'Phone 3373 Museum.

Aircraft

National Aircraft Mfg. Co., Ltd.,
15, Drummond Crescent,
Seymour St., Euston Rd., London, N.W.1.

Contractors to H.M. Government.

SWIFT
AVIATION CO.

Engine Plates in Stock,
Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE—
762 KINGSTON

'GRAMS—
"SWIFT, KINGSTON"

TIMBER

SILVER SPRUCE
ENGLISH ASH
WALNUT & MAHOGANY

JOSEPH OWEN & SONS
Limited
Borough Saw Mills,
LONDON, S.E.1.

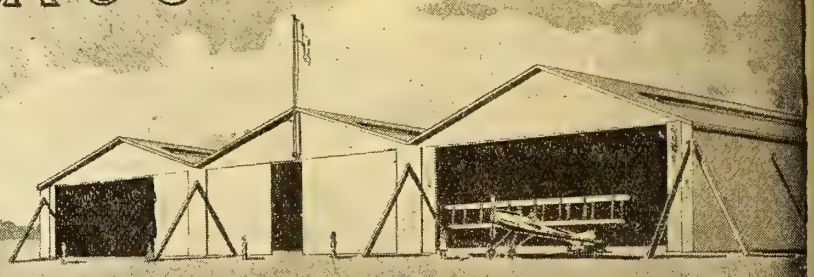
Telephone: Hop 3811. Telegrams: "Bucheron Sedist."

T. W. PALMER & Co.

ESTIMATES FREE

MERTON ABBEY IRONWORKS
LONDON · S.W. 19

DESIGNERS MANUFACTURERS AND ERECTORS OF EVERY DESCRIPTION OF AIRCRAFT BUILDINGS TEMPORARY OR PERMANENT



WORK CARRIED OUT TO OUR OWN OR CUSTOMERS DESIGNS

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
47, VICTORIA ST., S.W.

HIGH ST., MERTON, and HENDON

THE MIDLAND MOTOR CYLINDER Co. LTD.

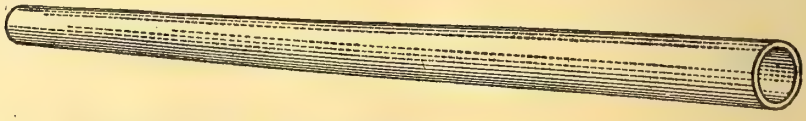
SMETHWICK
TELEPHONE—289 SMETHWICK

NR. BIRMINGHAM
TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER





Patent No. 4704/15.

McGRUER SPARS are THE ACME of STRENGTH and LIGHTNESS

Particulars from:—
McGRUER BENTWOOD HOLLOW SPAR Co.,
Commercial Wharf, Lambeth, LONDON, S.E.1.

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

WORKS: GOSPORT & SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street Hanover Square, W.1.

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE AIR SERVICES.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G.
COMPANY, LIMITED.

Telegrams: *Cellutate, London.*
8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4045.*
Works: Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)

THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

PLYWOOD

IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. **Telephone—London Wall 3577.**

Auster LTD for **AUSTER-TRIPLEX SHIELDS**
AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

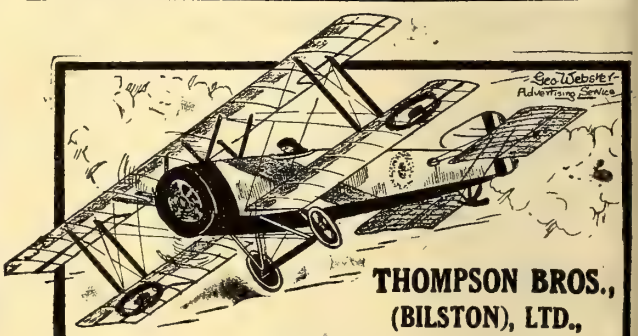
BIRMINGHAM: Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

HIDE GLUES *FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.*
— APPROVED —
Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.
Telephone: 4978 Avenue

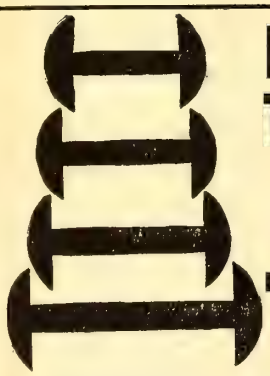
CRADOCK'S STRANDS & CABLES
Manufactured from Tinned Steel Wire of the Highest Quality.
CONTRACTORS TO HIS MAJESTY'S GOVERNMENT.
GEO. CRADOCK & CO., Ltd., Head Office WAKEFIELD. London Office: 7, East India Avenue.

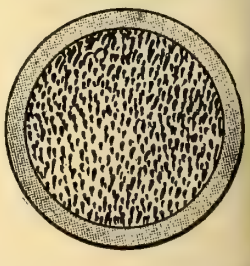
Lang Propeller LTD.
Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.

WOOLER ENGINEERING CO. LTD
Specialise in MACHINED METAL FITTINGS, and can quote for PROMPT DELIVERY your requirements in EYE BOLTS, SOCKETS, ELEVATOR and FLAP LEVERS, HINGES, &c.
Do you want your Stampings and Castings Accurately Machined? Send us your enquiries.
Large Stock of All Sizes R.A.F. No. 3 A Spec.
Limited Stock R.A.F. No. 1 E Spec.
OLD OAK COMMON LANE, WILLESDEN JUNCTION, N.W. 10.
Phone: Willesden 117. Telegrams: Two Stroke, London.



THOMPSON BROS., (BILSTON), LTD.,
— FOR —
UNDERCARRIAGES
TUBULAR FRAMEWORK
AERO. DEPT. BILSTON, Staffs.


DON'T HAVE TROUBLE
specify
SMITH & DAVIS MAKE
of
GREEN'S
Pattern
BELT FASTENERS.
From all Mill Furnishers and Ironmongers.
Wholesale only from Makers
SMITH AND DAVIS, LIMITED.
STAMPERS & PIERCERS, Hampton Street, BIRMINGHAM.

ANTOL CASE HARD

Harden your Screws and Gauges with ANTOL.
IT LEAVES NO SCALE.
PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1

NOTICE TO AEROPLANE WORKS.

SUPPLIES OF 'CROID' LIQUID GLUE.

The necessary additional plant having been obtained, the output of "CROID" Liquid Glue for Aircraft Construction, etc., has now been largely increased, and delays in the despatch of supplies will not, it is anticipated, arise from shortage, as has lately been the case.

THE IMPROVED LIQUID GLUES COMPANY, LTD
Great Hermitage Street and Bushell Street, London, E.1.
Telephone: Avenue 3178. Telegrams: Exceroiden, 'Phone. London.

The Best **Piston Rings**



Scientifically designed. Made from high tensile cast iron and hammered to give an even radial distribution of pressure. Gastight. Sizes up to 30 in. diam.

The BRITISH CHUCK & PISTON RING CO. LTD.
Holbrook Lane, COVENTRY.

The Air Navigation Co., Ltd.

BLERIOT & SPAD

ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.
NORBERT CHEREAU, Managing Director.
Telegrams—Bleriot. Weybridge. Telephone—353 Weybridge.

Aluminium Castings



Sand or Die of every Description
2 H.P. to 600 H.P
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

Contract to H.M. Government
Chill Castings for Aeroplanes a Speciality.
Telephones: 3846 City. 4879 Central. Telegrams: Kraskases. Isling London
R. W. COAN
219, COSWELL ROAD, LONDON, E.C
COAN CASTS CLEAN CRANK CASES

STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK

J. B. GUTHRIE & SON
(JOHN J. GUTHRIE)
30, ST. MARY AXE, LONDON
TELEGRAMS—BUSIRIS LED, LONDON. E.C.3.
TELEPHONE—AVENUE 1432.

Aeroplane Steel Sheets

as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

SMETHWICK, BIRMINGHAM
Telegraphic Address: "Bernico," Birmingham
Telephone No.: 224 Smethwick.

NOTICE!

Important to Aircraft Firms.

MANUFACTURER with every facility for expansion requires steady supply of orders for Metal Fittings (press and hand made). Samples of Parts already produced sent on receipt of card.

WILLIAM MILLER, Maker of Metal Aero Fittings, Tools, Dies, Stampings, Time Checks, Labels, Marking Punches, Stencils, Military Ornament, Works' Badges, Enamels, etc.,

21, HYLTON STREET, BIRMINGHAM.
'Phone: CENTRAL 1240.
Branch: 13½, Gt. Hampton St., Birmingham

Y.E.S. Telegrams: Y.E.S. LEEDS. Y.E.S. Telephone: 8927 CENTRAL.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'EATONIA' Process.)

Y.E.S. 'AERO' BRONZE
(Under A.I.D. Inspection.)

PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3′ 6″ long.

THE MOST DURABLE YET PRODUCED.

SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, LTD.,
WORTLEY, LEEDS.

Y.E.S. Y.E.S.

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS.

JOSEPH OWEN & SONS, Ltd.,
Borough Saw Mills, LONDON, S.E.
Telephone: HOP 3811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 5912. E. H. Godbold, Director
GODBOLDS

AEROPLANE STAMPINGS
IN 3 PLYWOOD.
Perfect cutting. Sample posted free.
SMALL PARTS UP TO 12 ins. by 4 ins.
A. W. ROSS, 20, HERTFORD RD., KINGSLAND RD., LONDON, N.1

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

NAME PLATES.
WE SPECIALISE IN EVERY DESCRIPTION OF NAME PLATES IN METAL, .VORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

CASE HARDENING BOXES.
IMMEDIATE DELIVERY.
ANY TYPE OR SIZE.
MCKENZIE, 15, NEWTON RD., CRICKLEWOOD, N.W.2

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd
All Metal Parts for Aircraft made, comprising following machine work: Milling, Turnin Shaping, Press Work, Slotting, Drilling, Grinding a Sheet Metal Work. Well-equipped Welding and Brazing Pla
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmon

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

BRAZING AND SILVER SOLDERING.
J. W. KING,
36, ST. JOHN'S SQ.
LONDON,
E.C.1.
TELEPHONE - - CITY 5238.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING
RUSSELL BROTHERS, Ltd., REDDITCH
MACHINES.

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

IAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; Id. per word after. TRADE ADVERTISEMENTS, n these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per line. For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1.

PATENTS.

E & ROWLINGSON, Chartered Patent ts (Consulting Engineer, Mr. S. E. A.M.Inst.C.E.), 27, Chancery Lane, on, W.C. Tel. 332 Central.

/ Skerrett, Chartered Patent Agent, 24, le Row, Birmingham.—Patents, trade s, and designs.

SITUATIONS VACANT.

ed at once for work on Handley Page nes in aircraft factory, London, N.W., a er of aeroplane erectors and assemblers; nacelle assemblers, and viewers on final on. There are also vacancies for sheet workers for petrol tanks and cowling, smith for pipe work, and panel beaters. district rate and war bonus paid in all No one on Government work or living than 10 miles away will be engaged.—Box No. 3556, THE AEROPLANE, 166, illy, W.1.

tor wanted for a new aircraft factory on uth Coast. Must be a first-class experi- man; thoroughly used to the assembly rueing-up of planes and erection of l machines; also able to inspect detailed anship during general progress of work. already engaged on Government work pply.—Give fullest particulars of quali- ns and salary required to your nearest yment Exchange, mentioning this paper o. 3554.

e Hand wanted immediately for a new t factory on the South Coast. Must be y first-class man to take direct control the general foreman of the erecting and able to supervise and check work h all details of machine erection; also of controlling and leading men. Only ss applications will be considered. No ready engaged on Government work pply.—Give fullest particulars of qualifi- and salary required to your nearest yment Exchange, mentioning this paper o. 3553.

ed at once, Assistant Draughtsman for work and quantities, preferably one aircraft work. Good wages and con- One hour from London. No person engaged on Government work will be d.—Applications should be made your nearest Employment Exchange, ning this paper and No. 3542.

number of Aircraft Fitters wanted, xperience of assembling engines into te machines. Full rate and war bonus. living more than 10 miles away or vernment work will be engaged.—Box 348, Sells, Ltd., 168, Fleet Street,

enced Man required to take charge of l wood parts, stores in large aeroplane n N.W. London. No one engaged on ment work or living more than 10 way need write to Box 349, Sells, Ltd., eet Street, E.C.4.

Superintendent wanted immediately for raft factory on the South Coast. Must roughly experienced in the assembly, , and completion of machines, and also control men tactfully but very firmly. already engaged on Government work pply.—Apply, in first instance, stating perience, and salary required, to your Employment Exchange, mentioning er and No. 3552.

nced Aircraft Fitters, Tool and Jig Plane Erectors, required at once. No ngaged on Government work or resi- re than 10 miles away need apply.—rticulars to Worms Aircraft Construc- , Ltd., Bournemouth.

Capable and experienced draughtsman wanted for jig and tool design on high-class repetition work, near London. No person already on Government work will be engaged.—Apply, stating age, experience, and salary required, to your nearest Employment Exchange, mentioning this paper and No. A.5160.

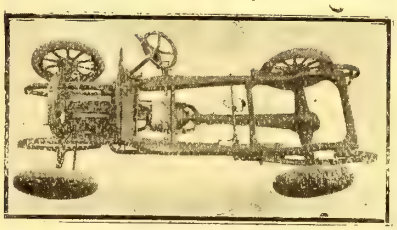
Shop Superintendent wanted for large aircraft factory in Yorkshire. While some knowledge of aircraft construction is essential, discipline and organising power are even more important. No person already engaged on Government work will be appointed.—Reply, giving age, experience, and salary required, to your nearest Employment Exchange, mentioning this paper and No. 3580.

FOREMEN
and PRODUCTION
MANAGERS
REQUIRED

to inaugurate departments at our new works. Good opportunity for men with knowledge of sheet metal working in all its branches. Must have initiative and be used to dealing with Trade Union labour. Preference given to men who have been used to aeroplane sheet metal work or similar occupations. No one residing more than 10 miles away or already engaged on Government work need apply.

Apply—**L. T. DELANEY,** *Managing Director.*
GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.1.

PALMER'S GARAGE & TOOTING ENGINEERING WORKS,



12-14 h.p.
FIAT CHASSIS FOR NATIONAL SERVICE.
PRICES, with new tyres:—
3-speed model, **£125** 4-speed model, **£150**
IMMEDIATE DELIVERY.
These chassis are the best value obtainable and run 25-30 miles per gallon of petrol.
Write for Catalogue of Fortnightly Auction and for details of my F.I.A.T. Secondhand Cars, Landaulets, Vans, Lorries, 2 and 4 Seaters, etc.
AUCTION SALE EVERY FORTNIGHT. Entries invited.
Next Sale, THURSDAY, 23 May, at 2 o'clock. Catalogues sent free on application.
PALMER'S GARAGE, TOOTING.
'Phone: 208 Streatham.
CARS BOUGHT FOR CASH.

Material Inspector required for large aeroplane work, Manchester district; practical experience of engineering and general stores materials essential; knowledge of aircraft materials an advantage. Good prospects for a capable and energetic man. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3566.

Works Manager, or position of trust, 37 practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, The AEROPLANE, 166, Piccadilly, W.1.

Draughtsmen, Senior and Junior, required at once. Preferably accustomed to aero engine work; also experienced Lady Tracer. No one engaged on Government work or residing more than 10 miles away will be engaged.—Box No. 3598, THE AEROPLANE, 166, Piccadilly, W.1.

Mathematical Assistant.—A vacancy occurs on aeroplane experimental work for an assistant having a good mathematical education. University preferred. Application, which must be made through nearest Employment Exchange, should give full particulars of age, qualifications, and salary required. No one already on Government work need apply.—Mention this paper and Box No. 3597.

Capable and Energetic Assistant to prepare charts, schedules, and statistics for planning of important aeroplane work. No person resident more than 10 miles away or already employed on Government work will be engaged.—Apply by letter, stating age, experience, salary, and military service particulars, to Box No. 3596, THE AEROPLANE, 166, Piccadilly, W.1.

An Engineering Firm in South London, engaged on aeroplane metal spares, requires an engineer for estimating, costing, and progress work. Good salary will be paid to capable man. No one already engaged on Government work or residing more than 10 miles away will be considered.—Apply, stating age, experience, and salary required, to Box No. 3579, THE AEROPLANE, 166, Piccadilly, W.1.

Metal Fitters required, preferably with experience of small parts. Tottenham district. Full union rates.—Apply, A. C. H., care of Messrs. H. Lebus, Finsbury Cabinet Works, Tottenham, N. No person already employed on Government work or resident more than 10 miles away need apply.

Required, Experienced Lady Tracer for aircraft work, London district. One used to detail.—Reply, stating age, full particulars of qualifications, and salary required, to Box No. 3605, THE AEROPLANE, 166, Piccadilly, W.1.

Required, Energetic Man for progress department in aeroplane factory, London district. No person resident more than 10 miles away or already engaged on Government work need apply.—Reply, stating age, experience, and salary required, to Box No. 3604, THE AEROPLANE, 166, Piccadilly, W.1.

Draughtsman and Assistant Draughtsman required for aircraft work. First-class men only need apply. No one already on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3603.

Chief Buyer required for aeroplane works in London. Must be reliable man, and have had previous experience for purchasing for aeroplane or mechanical engineering works. Knowledge of tools an asset. No one already on Government work or living more than 10 miles away will be engaged.—State age, salary, and experience to Box 399, Sells, Ltd., 168, Fleet Street, E.C.4.

Superintendent, Metal Departments, required for aeroplane works in London. Depts. include machine shop, tool room, fitting shop, and tinsmiths' shop. Experience of repetition work and automatics essential. No one will be engaged who is on Government work or living more than 10 miles away.—State age, salary, and experience to Box 398, Sells, Ltd., 168, Fleet Street, E.C.4.

Wanted, several experienced aeroplane draughtsmen; must be able to do detail design and simple stressing of detail parts. No person already on Government work will be engaged.—Apply your nearest Employment Exchange, mentioning this paper and No. A.5248.

SITUATIONS WANTED.

Works Manager, free to re-engage immediately. Twenty years motor, five years aero engines and planes: British, American, and Continental experience. Guarantees rapid, up-to-date and economic production. No service obligations.—Reply, Box No. 3551, The Aeroplane, 166, Piccadilly, W.1.

Position of Trust. Foreman Erector preferred. Three and a-half years' practical experience on various types of aeroplanes and seaplanes. Trial solicited.—Box No. 3599, The Aeroplane, 166, Piccadilly, W.1.

Mill Foreman, disengagad, recently engaged in large London aircraft factory. Good organiser. Used first-class accurate work; reliable; good references.—Foreman, 52, Stanger Road, South Norwood.

Aeronautical Engineer, well used to design and construction of aircraft, stresswork, tools and planning; shortly at liberty for responsible position in shop or D.O.—For particulars, apply C. E., 384, Goldhawk Road, W.6.

Works Manager, aircraf, disengaged about May 15th, seeks re-engagement. Sound knowledge construction all types of aero and seaplanes (including Handley Page). Can introduce effective methods for equipment and quick production. References, similar capacity, very good. Near London preferred.—Answer, Rose' "Spera," Wavendon Avenue, Chiswick, W.4.

Young Man seeks situation as works inspector or assistant; thorough knowledge of plane assembly. Final erection, details and timber; late A.I.D. Practical man. Grade 3.—Reply, Box No. 3601, The Aeroplane, 166, Piccadilly, W.1.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1

A London Firm in South-Western district has facilities for doping and covering, in addition to woodwork of all descriptions, with a large output and guaranteed deliveries. Estimate on application.—For further particulars, apply Box No. 3535, The Aeroplane, 166, Piccadilly, W.1.

Woodworking Firm (just finishing contract for flying boat parts) is prepared to undertake machining or assembling of any class of aircraft work, large works. Fully equipped with latest machinery; accurate work and prompt delivery guaranteed.—Apply, Box No. 3529, The Aeroplane, 166, Piccadilly, W.1.

Wanted, Woodwork Parts for Aeroplanes. Well-equipped factory.—Apply Box No. 3600, The Aeroplane, 166, Piccadilly, W.1.

HAULAGE.

Steam and Petrol Motor Wagons for Hire, for timber transport.—Apply, Silwood Storage Co., Ltd., 7, Victoria Street, Westminster, S.W. Telephone, Victoria 6882.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road, Manchester.

AVIATION.

AVIATION INSTRUCTION

on up-to-date lines, by a qualified Engineer in Aeronautics. Demonstrations from complete set of parts, and sectioned models.

Send for Prospectus No.1.A.,

THE MOTOR TRAINING INSTITUTE LTD.,

21a, Loudoun Road, St. John's Wood, N.W.8.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page IV. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264 or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester.

Cane Seats. Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

FOR SALE.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid. —Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Tarpaulins.—New waterproof khaki sheets for sale. Also second-hand railway truck sheets, repaired and redressed. London works.—For prices, etc., write Johnston, 12, Broughton Road, Croydon.

ENGINES WANTED AND FOR SALE.

For Disposal.—Two No. 617 120 h.p. 10 cylinder, Anzani engines. Revs., 1150/1200, complete with collector type exhaust pipes, magneto, zenith carburetter, etc. One engine runs clockwise, the other counter clockwise. In first-class condition, used for experimental purposes only.—Apply, Box No. 3606, The Aeroplane, 166, Piccadilly, W.1.

TO LET.

Part First Floor in substantial building, suitable small warehouse or workshop. Electric power installed, Gray's Inn Road district.—Apply, Box No. 3602, The Aeroplane, 166, Piccadilly, W.1.

MISCELLANEOUS.

MAKE MONEY BY WRITING

£50 PRIZE. Send postage (2d.) for ticulars and copy of "How to Earn M while Learning How to write for Newsp and Magazines." Practical and Co hensive Correspondence Courses—Fictio Articles, etc. Expert Literary Dire Constructive Criticism. Beginners t how to make work saleable. Excep testimonials. Address "Editorial" (A.), 22, Chancery Lane, London, W.C.2

MODELS.

T. W. K. Clarke and Co., Ltd., Mode partment, Hampton Wick.—Though w full up with full-size aeroplane parts c we still build models as we did in 1906. with Biplanes, etc., in Stock.—Send 3 s for our illustrated List, 120 items a models; certain metal goods are out of

Model Aeroplane, flies ¼ mile circular carriage paid, 3s. 6d. "I can thor recommend your machines." Testi from Dr. Adams, Union Road, Sh Thousands satisfied, testimonials fro parts.—Dept. C., Bristol Model Aer Depôt, Eastville, Bristol.

PUBLICATIONS.

BOOKS

By Lieut. Victor W. Page of the U.S. Air S

JUST PUBLISHED.

AVIATION ENGINES. Their Design, C tion, Operation, and Repair. A book for the Engineer, and all interested in Aviation, by a ised authority. Giving practical instruction and maintenance not to be found el Medium 8vo. 580 pages, with over 240 v tinctive and specially made Engravings. Price N

GLOSSARY OF AVIATION TER English-French and French-English. Cr 100 pages, with Plates and Illustrations Price

AN AVIATION CHART. A large Wal showing a typical Aeroplane Power Plan Section, with all important components Folding to Pocket Size. Price Net

London: CROSBY LOCKWOOD & 7 Stationers' Hall Court, E.C.

Just published. 360 *pp. with Illustrations,* 4½ 6¾ *in., limp cloth. Price* **6/-** *net (postage, 4d*

The Aviation Pocket Book for

By R. BORLASE MATTHEWS, Assoc. M. Inst. C.E., F.Ae.S.

Containing data on Aeroplane Theory and I Air Pressure and Resistance, Structural Ma Engines, Typical Aeroplanes, Piloting, R Meteorological Data, Scouting and Signallin etc. With Glossary and other information o to all interested in Aviation.

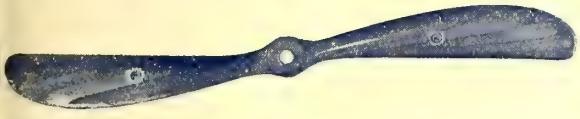
Prospectus on Application.

London: CROSBY LOCKWOOD & 7, Stationers' Hall Court, E.C.



CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Airprop, Hyde, London." Telephone: King-bury 104.

OXY-ACETYLENE WELDING & CUTTING PLANT

The Latest and Best Type of Plant for this Process as installe by the leading Aircraft, Shipbuilding and Engineering Firms, H.M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C. ATOZ G.B.

Carbide. Flarelights, Handlamps.
Petrol and Oil Storage Drums of any capacity. Steel Barrels, Sheet Metal Work for Aircraft, etc.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "Flamma, Vic, London." Telephone: Victoria 4830.

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office:

BROADWAY, CRICKLEWOOD, N.W.2.

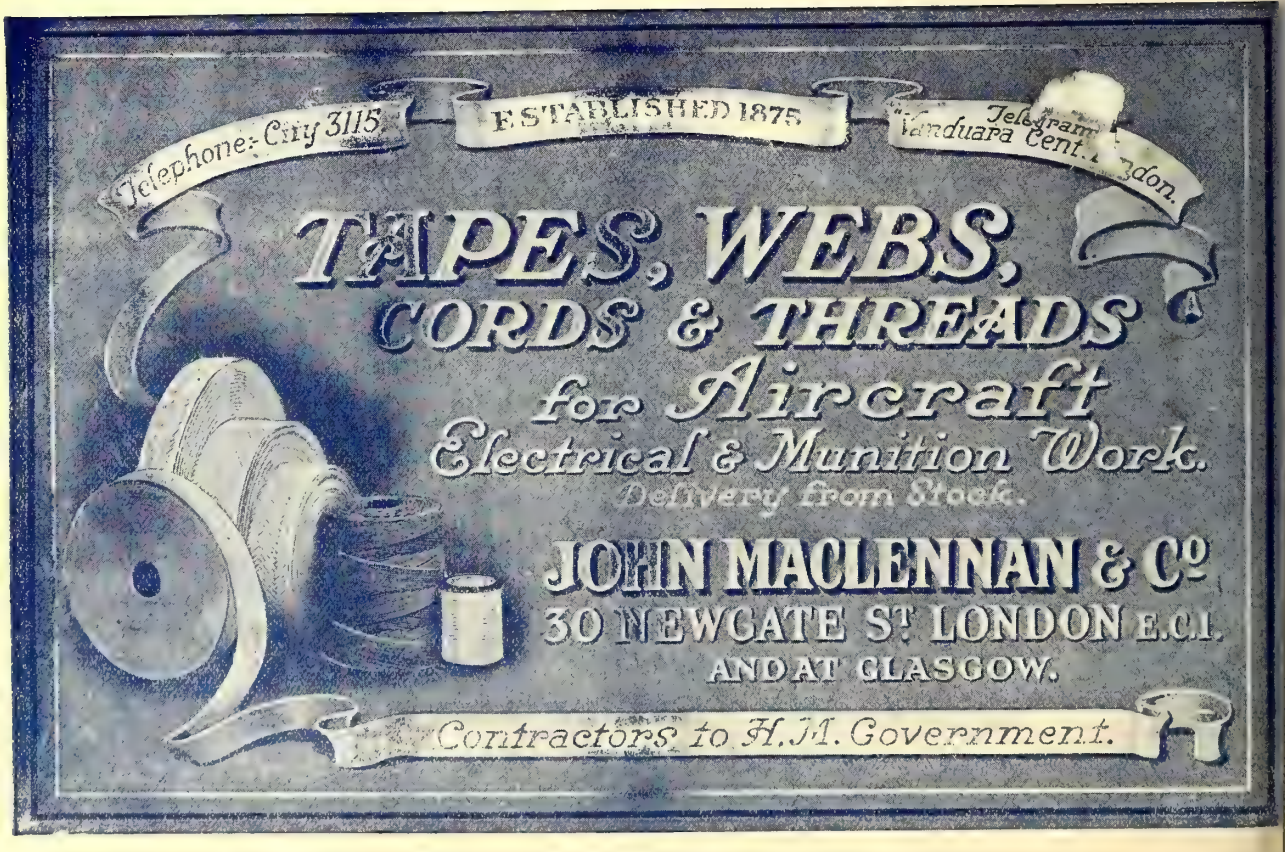
Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 4647 4648 HAMPSTEAD.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams: "*Airengine, London*" *Telephones: Gerrara* 8165; *Richmond* 1293.



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for The Aeropane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passag London: and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C.G. Grey

WEDNESDAY, MAY 22, 1918.

Vol. XIV. No. 21. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

John Dawson and Co. (NEWCASTLE-ON-TYNE), Ltd.

Newcastle-on-Tyne.

TELEPHONE ... ... CENTRAL NEWCASTLE 2604
TELEGRAMS ... ... "DEPENDABLE, NEWCASTLE."

Southampton House, High Holborn, W.C.1.

TELEPHONE ... ... HOLBORN 1876.

Auster LONDON. FOR Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE NON-POISONOUS DOPE

SEE ADVERT. INSIDE.

TELEPHONE:- OLDBURY 111. ACCLES & POLLOCK, LIMITED. TELEGRAMS:- ACCLES OLDBURY.

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc. TRIPLEX SAFETY GLASS The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street, BIRMINGHAM.



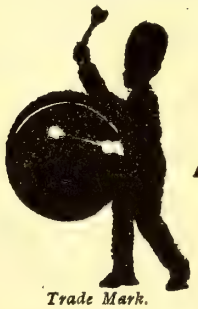
EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT



AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren, Piccy, London."
" Phone—280 Gerrard

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY



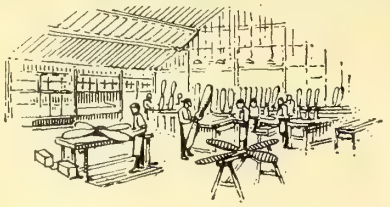
FOR more than three years the entire Siddeley-Deasy organisation and resources have been devoted to the service of the nation. In that period—and in that service—a position of absolute supremacy has been achieved.

The SIDDELEY-DEASY MOTOR-CAR Co., Ltd., COVENTRY. *Contractors to H.M. Air Ministry; Designers & Constructors of Aero Engines, Aeroplanes & Luxurious Motor Carriages*



Godbolds

Godbolds.



MEERLOO



A.G.S. PARTS

DAY AND NIGHT PRODUCTION.
THE MOST MODERN PLANT IN LONDON.

Immediate Deliveries of
NUTS, A.G.S. 115c. & 115b.

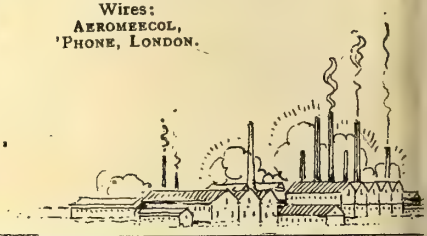
S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

THE MEERLOO ENGINEERING CO LTD

—AERONAUTICAL ENGINEERS.—
CONTRACTORS TO THE AIR BOARD.

Head Office: 199, PICCADILLY, LONDON, W.1.
Managing Director—JOHN MEERLOO, Junr.

'Phone: REGENT 1394.
Wires: AEROMECCOL, 'PHONE, LONDON.



THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome
and
The **GRAHAME-WHITE** School of Flying.

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

Contractors to the Admiralty and Air Board.

THE

CENTRAL AIRCRAFT COMPANY

DESIGNERS AND CONSTRUCTORS
OF AIRCRAFT.

Office
KILBURN, N.W.6.

Telegrams: Aviduction, Phone, London.
Telephone: Hampstead 4403, 4404.

HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON

WARING & GILLOW LTD

Furnishers & Decorators to H.M. the King

CONTRACTORS
TO THE
WAR OFFICE AND ADMIRALTY.

LIVERPOOL HAMMERSMITH LANCASTER

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

HEAD OFFICE
OXFORD ST. W.1

TELEPHONE No.:
HAMMERSMITH 1980

TELEGRAMS:
"Warings Factories, Hammersmith."

ESTABLISHED 1912
CONTRACTORS TO H.M. AIR MINISTRY

The SUPERMARINE
Aviation Works, Ltd.

DESIGNERS & CONSTRUCTORS OF **FLYING BOATS.**

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. COTTON-PAINE, Director & Gen. Manager.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

OFFICES,—
SOUTHAMPTON, Eng.

THE SUPER-AVIATION CO. LTD.

Aeronautical Designers, Constructors and General Engineers.

Manufacturers of Complete Machines and Spares.

CONTROLLED ESTABLISHMENT under the WAR MUNITION ACT.

DUDDENHILL LANE. WILLESDEN, N.W.1.

Telephone—WILLESDEN 642.
Telegrams—"SUPAVICOL," LONDON.

Managing Director—N. LEWIN, A.C. E.Mech.

S.E. Exhaust Pipe Extensions and Brackets
Dr. Nos. 11792 and A11793-2.
For Delivery from Stock.

Pressings in Steel up to 4-Gauge, Milling, Shaping, Turning, Grinding, Slotting.

P.D.V. AIRCRAFT Coy., Ltd., Richmond & St. Margarets.
Registered Office: PRINCESS STREET, RICHMOND.

D.H. Dies.

Send us along your enquiries and we will quote by return.

Press Tools and Gauges
made by experienced Tool Makers for the Trade.

Tanks and Sheet Metal Work.

Telephone—1681 RICHMOND. Telegrams—AEROS, RICHMOND.

HIGH-CLASS

Aluminium Castings

FOR ALL TRADES.

We specialise in Aluminium Cylinders and General Aero and Motor Engine Castings.

Cast Iron Cylinders

(ONLY)

Water and Air-Cooled for Aero and Motor Engines.

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,
ALUMINIUM AND IRON FOUNDERS

BIRMINGHAM.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910. Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams
JONAS.
SHEFFIELD.

REGISTERED
I C NOV
TRADE MARKS.

Telephone No. 4660.
PRIVATE BRANCH EXCHANGE.

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears. Crankshafts and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
For severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

SHEFFIELD.

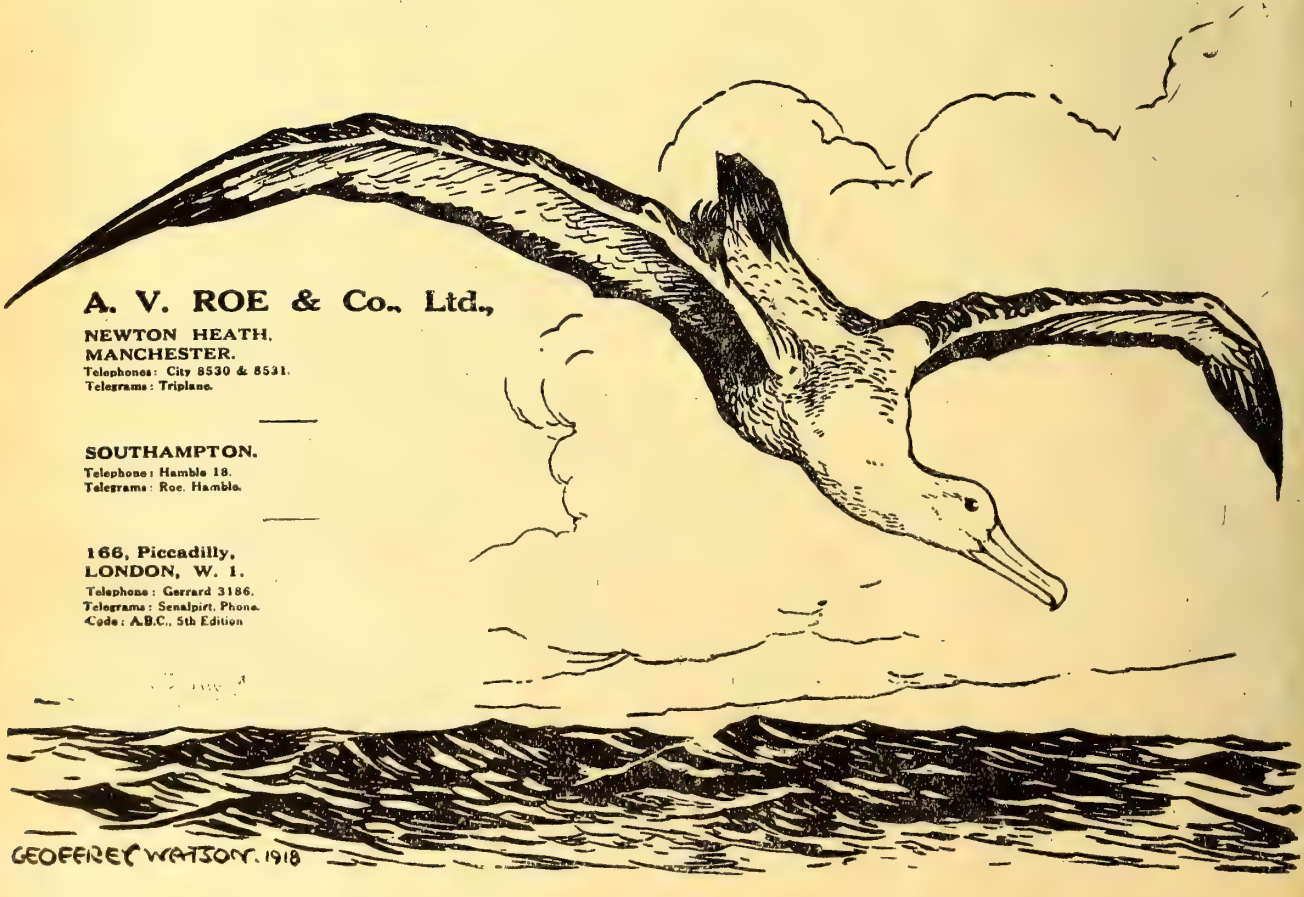

The
WIGHT
SEAPLANE
J. Samuel White & Co. Ltd
EAST COWES
I. of W.
AIRCRAFT
CONSTRUCTORS
Telegrams, WHITE, EAST COWES.
Telephone No 3 COWES


Non Flam Celluloid
GREENHILL & SONS
8 WATER·LANE·LUDGATE·HILL
LONDON. E.C. 4
Phone Central 1306 & 1307
Telegrams "GREENBERG" LONDON



AVRO

AEROPLANES
AND
PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Sensalpirt, Phone.
Code: A.B.C., 5th Edition

GEOFFREY WATSON. 1918

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeronautical and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON GETTING ON WITH THE WAR IN AMERICA.

All catch-phrases, like catchy tunes, are apt to be overdone. Being catchy, they catch the limited intellect most easily, and the limited intellect, being without resources of its own, proceeds to wear out its newest toy in the manner usual with childish minds. The latest phrase to be worn thread-bare is "get on with the war." Really it is quite a good phrase, and, properly applied, it is of national importance. Improperly applied, it becomes either a nuisance or a camouflage, or both.

As a case in point, when some truly patriotic member of Parliament tries to bring home to the House of Commons some of its sins of omission or commission, and goes too near the unpalatable facts—as, for instance, Lord Hugh Cecil did quite recently—his home truths are drowned by cries of "Get on with the war!" vociferated by perhaps dozens, perhaps hundreds, in any case the majority of those present, none of whom have done more towards helping the victory of the Allies than to spend some of their time in the House of Commons and thereby deprive themselves of that much time in which they might have done worse harm outside. Thus these blatant M.Ps. at the same time hinder those who want to get on with the war, and throw a camouflage over themselves by pretending to rebuke others.

A Critical Period.

Nevertheless there are distinct signs that we shall really be doing something definite towards winning the war ere long. We are to-day passing through one of the most critical periods of the war, but one believes that the actual critical point was passed when the Germans failed to reach Amiens and failed to take Hazebrouck.

Some people seem mighty concerned about the fate of Ypres, but actually Ypres is of no importance whatever, and the Army would in fact have been stronger by many good men—probably several divisions—if General Smith-Dorrien's advice had been taken years ago, and if we had then drawn our trench-line behind Ypres instead of in front of it. However, what is done cannot be undone, and the magnificent quality of the Allied Armies in France is the best insurance against any chance of a moral rot setting in, even if much more than the flattened town of Ypres and its surrounding quagmires were presented to the enemy. The French catch-phrase "*Passeront pas*," which amounts in France almost to the importance of the foundation of a religious faith, expresses the situation at its worst.

It may be a long while before "*Passeront pas*" becomes "*En Avant!*" but the time for advance is coming, and the coming of that day depends on our methods of getting on with the war behind the fighting line. If each person in the Allied countries devoted himself, or herself, wholly to that task henceforth, instead of seeking for personal aggrandisement or enrichment, or indulging in internal quarrels, the critical period would be very much shortened.

Good Out of Evil.

It is curious how good comes out of evil in critical periods. As a notable instance take the aircraft position in general and that of America in particular. It has recently been announced officially that President Wilson has appointed a controller of aircraft production to supersede that monumental wash-out, the much-boomed "Aircraft Production Board." It has also been admitted openly that out of the 10,000 American aeroplanes, more or less, which were advertised to have darkened the sky and reddened the soil of Germany by about this period of the war, some two or three samples—alleged to be of indifferent merit—had actually reached Europe up to approximately the end of April.

An amiable effort was made in the press recently by Mr. Edward Price Bell, the well-known American publicist, to gloss over this non-arrival to schedule time by explaining that shipping space was better employed in transporting men and food to Europe than in bringing aeroplanes, and that American factories were better employed in making school machines on which to give elementary training to would-be pilots and observers on the American Continent, than in making war machines. All of which is perfectly true, though it has so fallen out by the Grace of God and not by any human design.

Many men and much food can be conveyed in the space which would be needed by few aeroplanes, and meantime the American factories are learning, while building school machines, how to tackle the higher art and science of building war machines.

The Better Whole.

It has been announced officially that there are now half a million American troops in Europe. There would have been many less if America had started shipping aeroplanes in quantities. All men and no aeroplanes constitute a better whole than part men and part aeroplanes, for the men are wonderfully good, and the aeroplanes would indubitably have been wonderfully bad.

The American who elects to join the Allied Air Force is, on the average, of very high quality. Before America came into the war we had many citizens of the United States, generally posing as Canadians, in both the R.N.A.S. and the R.F.C., and there were many in the French Service d'Aviation also. Their notions of discipline were quaint, according to our old-world ideas, but they were—and are, one may still say of most of them—magnificent fighting men. Moreover, they seem to have natural aptitude for flying, an aptitude due doubtless to their initiative and self-reliance inherited from ancestors who would not have become Americans if they had lacked the initiative and self-reliance which

forced them to go and carve out for themselves a new nation in the New World.

One notices also that many Americans who come to Europe take the war very seriously, and do not regard it either as a glorified form of sport, as an outlet for their own ambition, or as merely a bit of a bore which cannot be helped and so must be endured with as little personal inconvenience as possible. They seem rather to be quite determined to get on with the war as expeditiously as possible. Which is very estimable, so long as the individual retains his personal sense of humour.

American Humour.

Apropos which, some of our American Allies are already enriching the language of aviation. As for example an American pupil who landed at an aerodrome in England in the course of a cross-country flight, and crashed his machine rather badly. Having extricated himself from the wreck, he wandered up to the Squadron Office, and, addressing himself to the C.O., remarked: "Say, Mister! Are you the Big Noise in this Constituency?" The C.O., being used to the unconventional American, civilly admitted the soft impeachment. Whereupon the pupil continued: "Well! I've come to tell you that my gasoline kite has spread itself some over your pasture."

History unhappily fails to record the rest of the conversation, but one is grateful for even so much enrichment of the English language. "Gasoline kite," or more briefly "gas-kite," has now passed into standard use at some of our aerodromes. Not that our British aerial navigators cannot themselves turn out expressive terms when necessary. For instance one gathers that, as an off-set to the name "Blimp," applied to the small submarine scout airships, the crews of the largest-sized airships, intended, like the German Naval Zeppelins, for deep-sea air work, in connection with battle fleets, call their big craft "Battle-bags." Which seems quite distinctive and expressive, if a trifle inelegant

The Serious Mind.

Nevertheless, not all Americans are gifted with a sense of humour, and one gathers from one or two letters that certain recent remarks in this paper on the much advertised Liberty engine have been taken *au grand serieux* by a few Americans now in training in this country, who, to judge from their writing, believed that one's endeavours to correct over-enthusiasm, and so to prevent disappointment, by a little gentle sarcasm, were likely to imperil our alliance with the United States and lose the war.

One learned then for the first time that Americans actually exist who object to having their legs pulled. Really, people who take life so seriously as all that may be in grave danger of taking death equally seriously, and that is a fatal attitude of mind for a soldier, whether an aviator or not. It is an excellent thing to be serious about one's work, but it is quite dangerous to one's work to be too serious about life in general.

One prefers the attitude of mind of one of our dead pioneers of flying, who always took the greatest care to see that the curious contraption which he flew was in the best possible order, though he invariably laughed at its construction, its engine, and everything in it, and when he had made a bad job as nearly respectable as it could be made, used to push off into the air, after remarking, "I will now proceed to have another grapple with Gabriel." Eventually Gabriel won, for that pioneer was killed in trying to avoid killing people in a crowd, which he could only avoid by an evolution which was impossible on the machine which he was flying, though it would have been simple enough on a modern aeroplane. He was deadly serious about his work, but to him life and death alike were a joke.

The Liberty Engine.

However, to return to the Liberty engine, and getting on with the war. Opinions of Americans who ought to know range all the way from the belief that "the Liberty is the last possible thing in gasoline engines," to an equally sincere belief that in making the Liberty engine in vast quantities "the United States is engaged in piling up the World's Record Junk-Heap." Probably the truth is somewhere between the two.

The Liberty looks quite a nice engine. It is free from external gadgets, which of course pleases the engineer who judges by externals, and forgets that a French locomotive with, so to speak, all its bowels outside, puts up as good a performance as any British engine, and is easier and quicker to repair in small matters. It would, for example, please the American who, after watching a wonderful test-run by a Rolls-Royce, allowed that it was "some engine" and then remarked, "but, say, it could do with a shave." Personally, one prefers to have an engine, or a car, bristling with gadgets outside where one can get at them, instead of having them stowed away so that one has to dismount the whole engine to adjust a throttle lever or renew an oil-pump washer.

On test Liberty engines produced in experimental shops have done very well indeed. It remains to be seen whether those turned out by the thousand in "automobile plants" will do as well.

The most surprising thing is that so knowledgeable a people as the Americans should have concentrated so much energy on a water-cooled engine, just when the Germans had discovered that water-cooling is not the only thing for war flying. A bullet grazing a cylinder of a water-cooled engine means a perforated jacket and seizing up inside ten minutes. A graze on an air-cooled cylinder probably means no damage at all.

Also the Germans have apparently made up their minds that their powerful water-cooled engines are not the best things for single-seat fighters, for, after trying the eight-cylinder 240-h.p. Mercédès and the six-cylinder 260-h.p. Mercédès, they came back to the 180-h.p. six-cylinder, with specially high compression, a lighter engine altogether, which meant a lighter aeroplane, quicker to manœuvre in fighting. And after that they mounted their crack fighting pilots on triplanes with 110h.p. air-cooled engines, which, despite shocking construction, were actually better fighting machines, and would have played havoc with the French and British aviators but for the fact that the newer machines and engines of the Allies were still quicker in handling and better built.

It is, therefore, the more surprising that, with the amount of experience of the Franklin system of cooling available all over America, from the hottest climate in the Southern deserts to the coldest in the high-level roads of the Rockies, America should have standardised on water-cooling. One is given to think whether, in America as elsewhere, vested interests are stronger than the desire to get on with the war.

America's Mistake.

The worst mistake made by the Americans to whose care the production of aircraft was committed a year ago was in assuming that they knew anything about aeroplanes or aero-engines. So far as one can recollect none of the important gentlemen who constituted the Aircraft Construction Board had had any previous experience of aircraft work, and so far as one can gather they were not particularly anxious to consult the few men in America who had practical experience of flying.

Their mistake was not due to lack of opportunity to learn, for Americans were the first men to fly, and only the truly Anglo-Saxon thick-headedness of the American business man prevented America from being the leading aeronautical country before the war and caused it to be the last. Not only were Americans first in flying from the ground but they were first in flying from water, and yet my esteemed friend Glenn Curtiss could obtain no support in his own country. The enormous growth of his factories before America came into the war was due to orders from Britain and Russia, and not to American business acuteness

All the other American aeroplane makers were entirely neglected and one can scarcely blame them for failing to make good on quantity-production propositions in one year. The man who has been in the habit of making one aeroplane a year in a shed, assisted by two men and a boy, is scarcely fitted to run an aeronautical sausage factory, and the man who has run a plant which makes automobiles or rocking-chairs by the million is still less fitted to make aeroplanes of war. So naturally America has had much to learn.

However, it now seems that the Aircraft Production Board, which apparently has made every possible blunder in the past twelve months, has been washed out, and that a capable Irish American, Mr. Ryan, has been put in sole charge of the job, to do for America what Sir William Weir has done for Great Britain. In America the Irishman does the things which in England are done by the Clydeside Scot, so the appointment seems full of promise.

The Wrong Way to Work.

Lord Derby—whose recruiting scheme has left such a bitter taste in the mouth of those who trusted that nobleman's word—said in a recent speech that one should check the desire to find something wrong with another nation and should dwell on that which is good.

Lord Derby's official position gives more weight to his *obiter dicta* than does anything among his own acts or words in the past. He has consistently displayed complete misunderstanding of human nature, and never more so than in this latest saying. Nothing is more deadly to the success of the Allies' cause than complacent mutual admiration.

This desire to hide all that is bad, although it is known to exist, and to glorify what is fair to moderate, is merely another manifestation of that all-pervading Nonconformist Conscience which has so hindered us in getting on with the war.

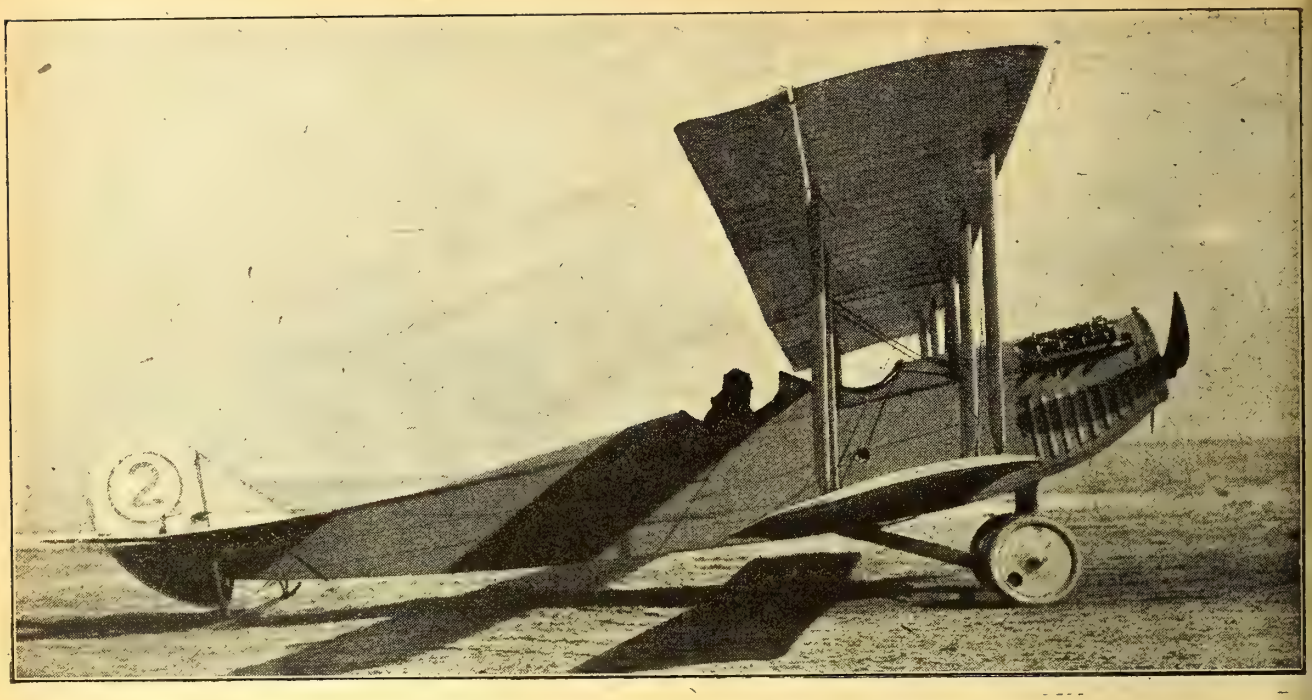
Our Government-doped press keeps on telling the people of this country that all is well with the Navy, all is well with the Army, all is well with the Air Force, all is well with all our Allies, and all is well with the Government—especially the Government. The result is that the unthinking millions who read those papers really believe that all is well and simply sit with their hands in their pockets and believe that they have won the war.

It does not seem to have occurred to the Government and its hangers-on that the time will come when even the fool Englishman's intelligence will awake sufficiently to prompt him to ask why, if everything is so perfect—especially the Government—we have not won the war. When once he shows so much intelligence he may either decide that we cannot win the war, or he may decide to make somebody pay *in corpore vile* for not winning the war—especially the Government.

Possibly the recently adopted Government policy of



AT AN AMERICAN TRAINING SCHOOL IN FRANCE. Mr. Baker, the American War Secretary, watching a "fly past" of American Aviators on un-American aeroplanes.



A Typical American "Training Tractor," the J. N. type Curtiss.

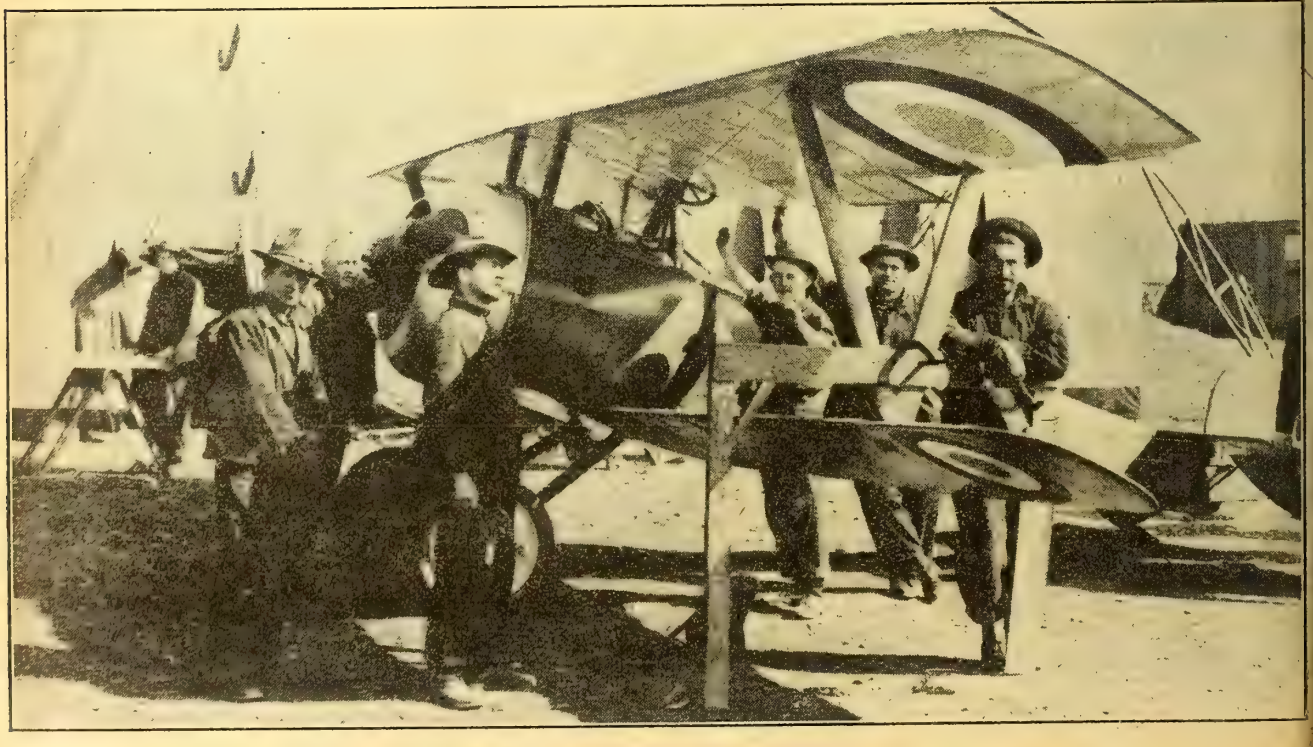
"when in difficulties blame the soldier" may show an appreciation of the situation indicated in the foregoing paragraph, but the Government may find that when it comes to the pinch the people will awake to the fact that in these days the People and the Army are the same thing, and that the Government is something very different—thank Heaven for it. In that day the People will follow their Military leaders and not their political misleaders.

Meantime, the Government is sedulously going the wrong way to work either as concerns maintaining the confidence of the people or getting on with the war. Instead of dwelling on that which is good—especially in the Government—let it find what is wrong, and let it advertise the fact that it is being put right both here and in Allied countries.

Cleaning Up.

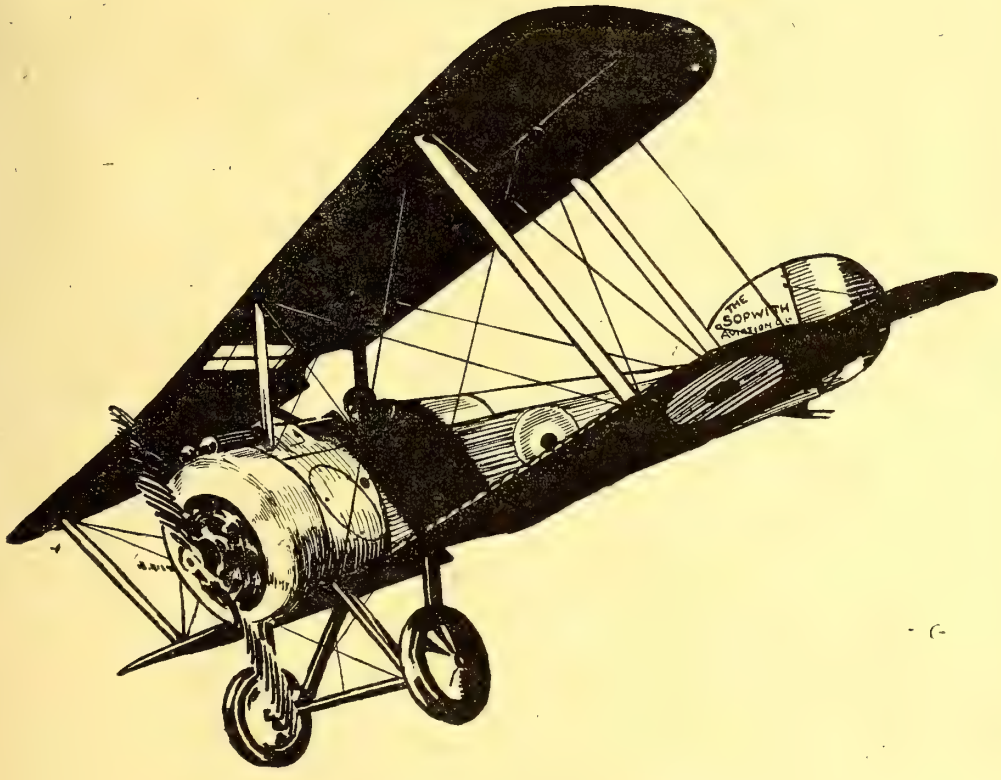
France is clearing out her Bolos and *Bonnets Rouges*, and is advertising the fact. If Sir Cecil Spring Rice had lived, instead of dying mysteriously in Canada, we might have by now been doing as much in this country. America is cleaning up her aircraft production and her other scandals, and is doing it, like France, openly so that the confidence of the people is increased by seeing that the rulers of the country are in earnest. Which is precisely what is not apparent in this country.

Only in England, where everything is so perfect—especially the Government—none is made to suffer for alleged error except the men who have won the confidence of the Navy and the Army and the Air Force. Which is so likely to increase the confidence of the King's Armed Forces in their leaders, is it not?



Typical American Air-Mechanics, with a French aeroplane at one of the American schools in France.

THE SOPWITH

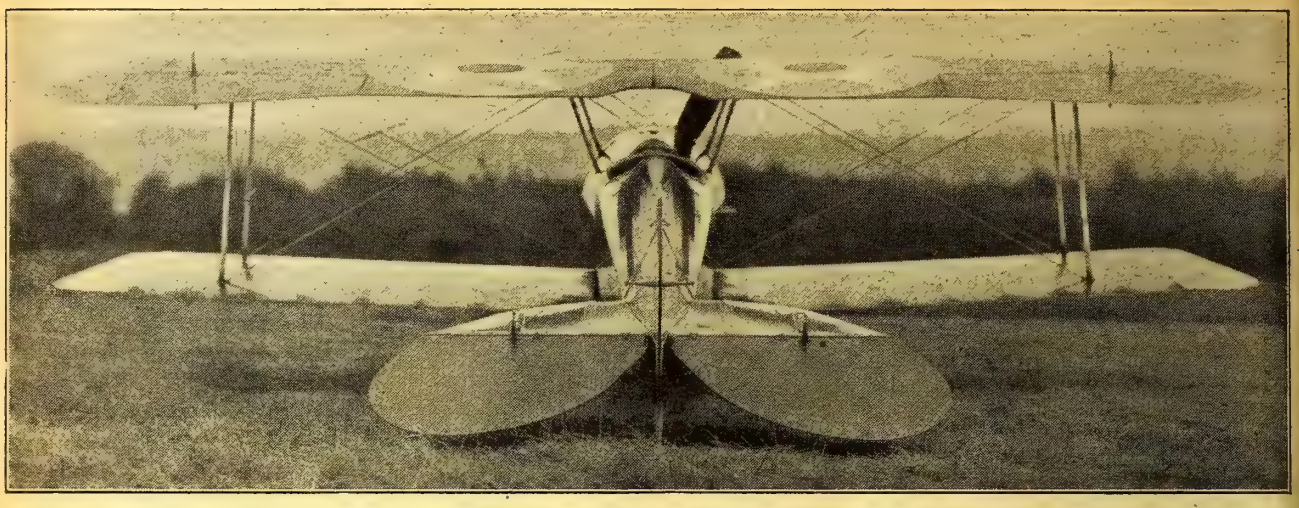


AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

Paris Office:
21, RUE DU MONT THABOR.



Back View of the Thomas Scout, a neat American single-seater training machine.

Wakening the Anglo-Saxon.

As one has said on previous occasions, the only way to instil life into an Anglo-Saxon is to scare him to death. This applies just as well to the Anglo-Saxon American as to the Englishman.

Tell an Englishman that his Army is broken, if not beaten—as Mr. Hamilton Fyfe told us in 1914—and he will enlist in his millions to prove you a liar. Tell him that his Army has won the war and he will become a concentrated Cuthbert, and will use all his ingenuity in dodging military service.

Tell an American that he cannot make aeroplanes, that his wood-work is not fit to be used in soap-boxes, that his engines are only fit for the junk-heap, and that his engineers are only capable of making preserved meat cans, and he will start right in to make real flying machines fit for war work. Tell him that his "airplanes" have a remote resemblance to the apocryphal instrument which his journalists call a "battleplane" and he will flap his arms like an American eagle and scream that he has got the Archangel Michael beaten to a frazzle as a fighting aviator.

It is no good handing out what the American calls "taffy" to the Anglo-Saxon, no matter which side of the Atlantic he inhabits. As Mr. Kipling has said, apropos dealings with the English:—

"Don't ride over seeds, keep your temper, and never you tell him a lie."

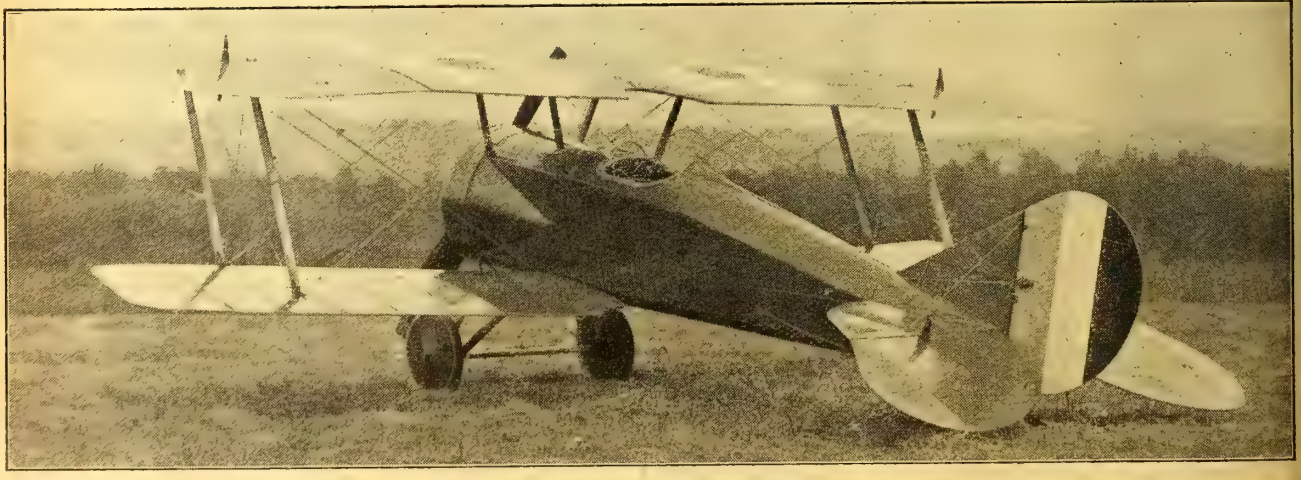
Which is precisely what those in authority in this country—especially the Government—do not yet seem fully to comprehend.

Quick Reforms.

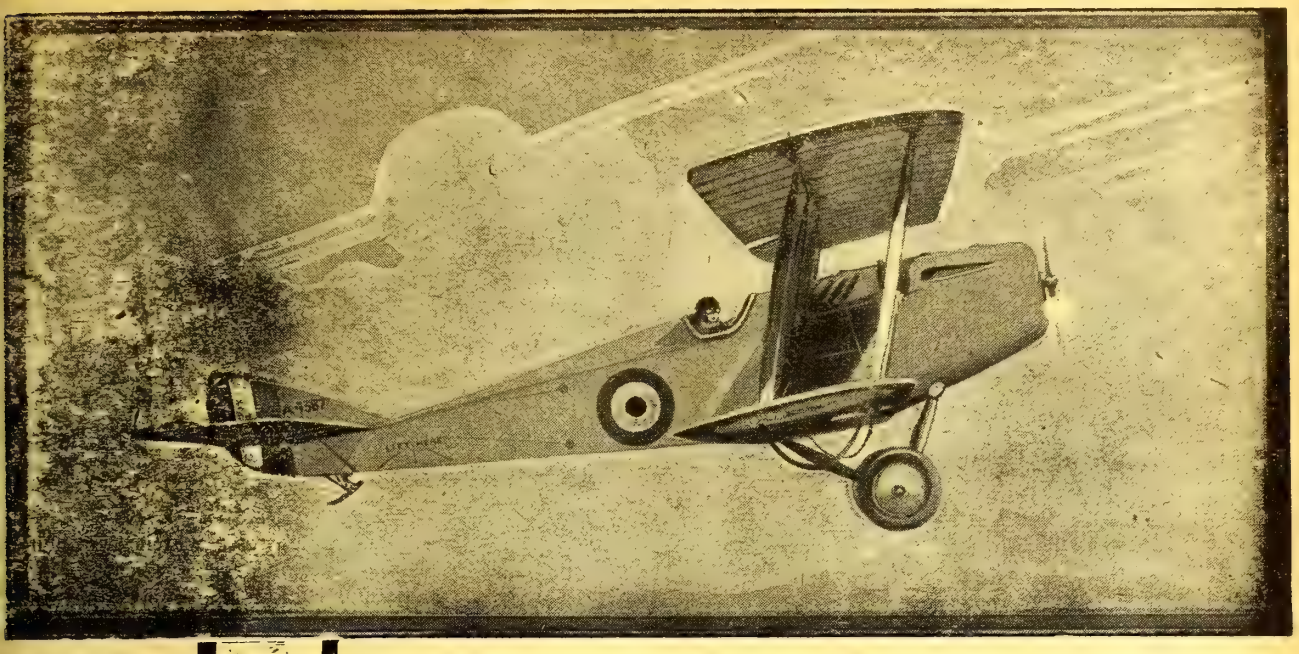
Very soon after America's entry into the war, a wise American remarked that America would make all England's mistakes and a lot more besides, and much bigger mistakes, but that she would make them in twelve months instead of in three years. One has heard much in the past of "graft" in America. It was rampant in the Civil War of the 'sixties; it is said to be as bad to-day. But the virtue of graft in America is that there is no particular objection to a man's grafting so long as he delivers the goods. America is not the victim of the Nonconformist Conscience as we are in this country.

Our system of graft consists in social and personal influence, in the Chapel, the Church, the Club, the Services, or the Courts. It may be strictly honest, from the highest moral standpoint, or it may not. It works just the same as the American system, in that the wrong people get the orders, the honours, and the responsible jobs. Being social and personal it takes longer to work than the American system, for it takes years to build up the necessary personal position, whereas it only takes a minute to hand out a bunch of banknotes. And when the grafter has failed to deliver the goods, whether as a manufacturer of war material, or as a Government official, or as a politician, it is harder to convict him and harder to get him punished than if it were a case of money graft, for his downfall is prevented by all the social influence of those who backed him.

In America when a grafter fails to deliver the goods



Three Quarter Back View of the Thomas Scout

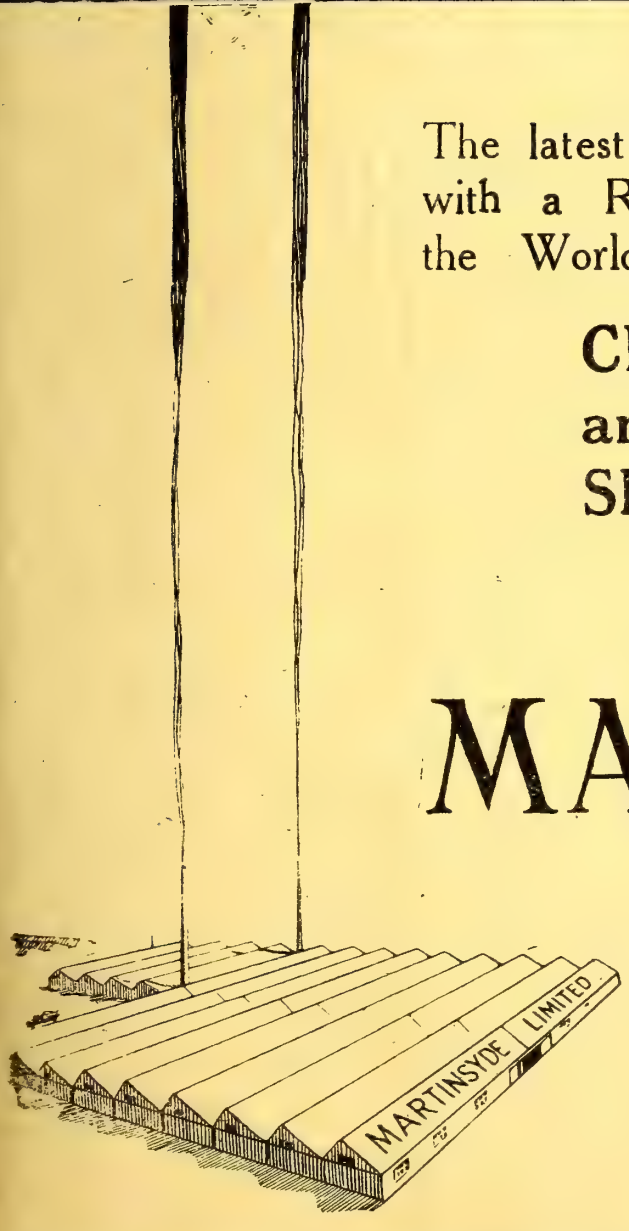


The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds the World's Records for

CLIMB
and
SPEED at HEIGHT



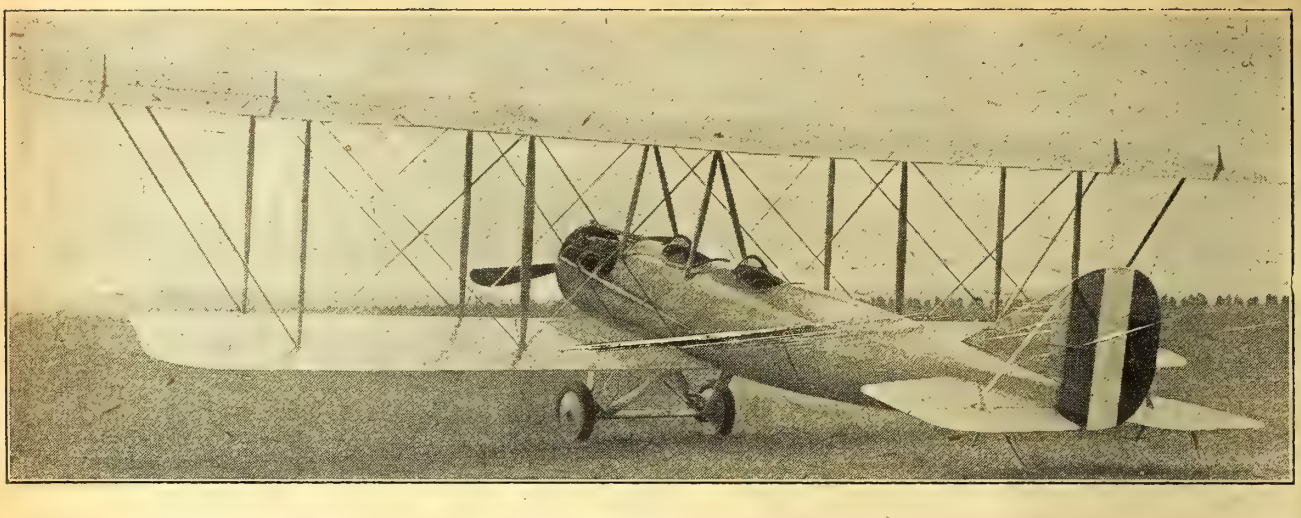
MARTINSYDE



Head Office

WOKING, Surrey.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



Three Quarter Rear View of an American Training Tractor, The Wright-Martin with Vee Engine.

he is thrown over at once. Someone else is put to do his job, and America is able to get on with the war. The penalty in America is inflicted, not for being found out in graft, but for failing to deliver, and the penalty is the very severe one of not being able to graft any more. Which, though it may not be the highest moral course, is certainly the quickest, and the most productive of efficiency.

And that is why, although the Congressional Committee which was appointed to look into the reasons for America's failure to deliver everything except men after a year of war has disclosed a mass of the most amazing blunders and intrigues, America will very soon be able to restore strategic and tactical initiative to the Allies in France.

Keeping Pace with the Times.

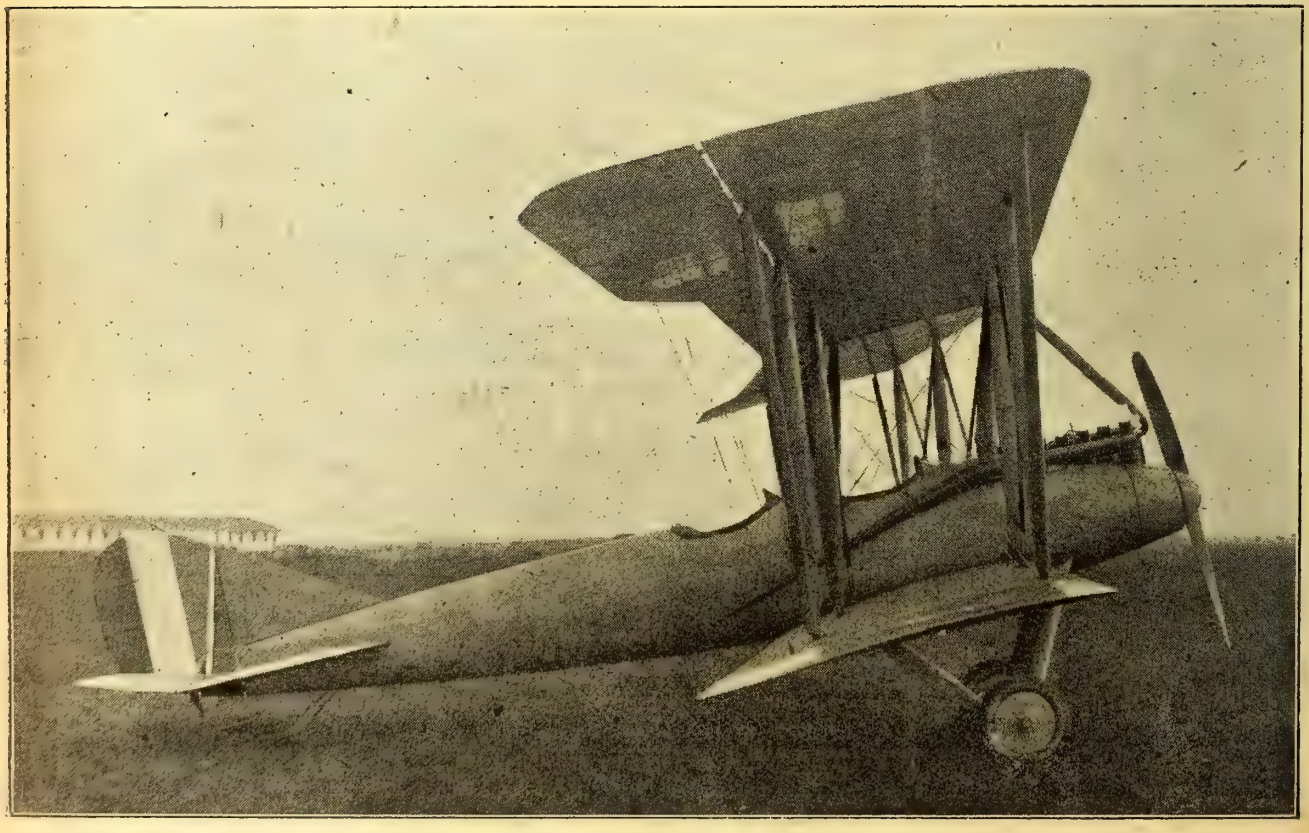
There is one point in particular in connection with aeroplanes which America must learn. It is impossible to standardise aeroplane design, because designs are constantly changing.

There is an aged "Punch" picture in which a French sportsman is shown aiming at a pheasant running along the ground. An Englishman alongside him says, in amazement, "But, surely, monsieur, you are not going to shoot him running?" "*Mais non, m'sieu',*" replies the Frenchman, "I vait till 'ee stop!"

It is no use for the American aeroplane producer to stand and watch aeroplane design and "vait till 'ee stop." Aeroplane design is flying in these days.

Also there is no use in fooling around waiting for drawings. One may again recall the story of Stonewall Jackson, alleged to be the first American general to cart around a proper corps of military engineers. In one of his advances he came to a river minus bridges. He sent for his chief engineer officer and told him to get out plans for a bridge, and he sent for his chief ordnance officer, a hardened old campaigner, and told him to get material ready to build the bridge as soon as the engineers had their drawings ready.

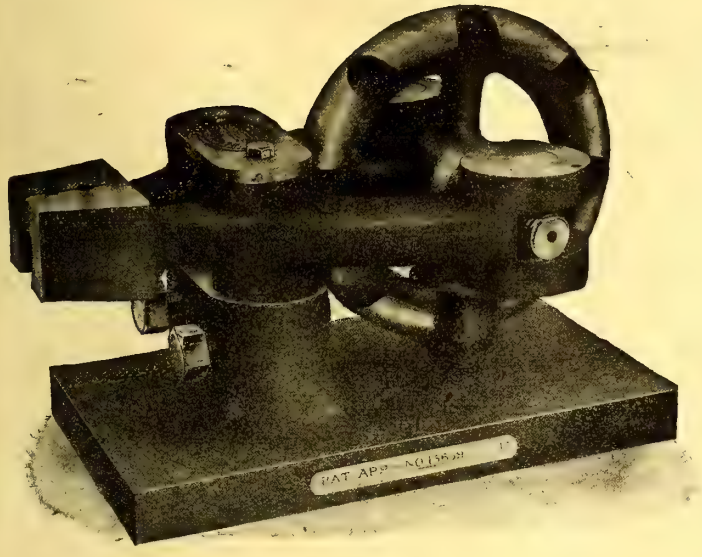
At the end of two days the ordnance officer went to



Side View of the Wright-Martin, with Vertical Engine.

F.106.

A wonderful Time-saver

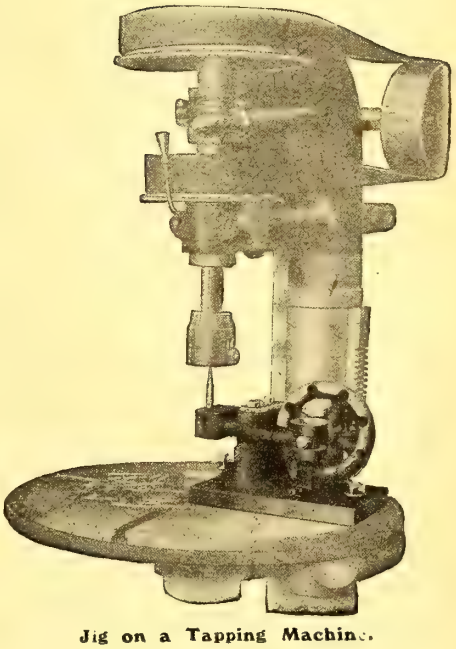


The BLACKBURN PATENT UNIVERSAL JIG for MILLING, TAPPING and DRILLING

Why waste time in making a Jig for each job ?

The Blackburn Universal Jig has been specially designed to meet emergencies which arise in milling, tapping and drilling. It is always ready, and secures accuracy and quicker output.

Half a turn of the hand-wheel releases the fitting.



Jig on a Tapping Machine.

For Price and full Particulars, apply direct to the Manufacturers,

BLACKBURN AIRCRAFT PRODUCTS,

30, Norfolk Street, Strand, W.C. 2.

Blackburn AIRCRAFT

Steele's Ad. Serv.

Jackson and said: "Say, General! That bridge is finished and I reckon the Army can be getting right along. But we're still waiting for them pictures."

It seems that American aeroplane constructors are still waiting for "them pictures" of modern aeroplanes from this side. If they wait for them to be complete, accurate, and immutable in design, they will wait till the end of the war. The proper way to reproduce aeroplanes in quantities is to get a sample machine, take it to pieces, and make a "Chinese copy" of it, using the pieces as samples. One has known such a copy to be in the air and flying inside five weeks of the arrival of the sample in the reproducer's factory. One has never known a complete and accurate set of drawings to be produced inside five months, though possibly such things have happened.

If American manufacturers are to be a success as producers of aeroplanes they must organise for quick changes in design and not for vast output. That is the art of making war aeroplanes. The factory which can "swop over" from one design to another in the quickest time is the one which will do most to get on with the war.

Profiting by Our Mistakes.

American representatives in this country and officials in America should study the history of aviation in Great Britain for the past three and a half years. It would save them much in the next twelve months. One wishes that one had time to prepare a handbook on the subject for their assistance. Still, the files of this paper are always available to them if they care to spend a week in learning enough to save them months of useless work, let alone millions of dollars and probably hundreds of lives. Our mistakes since the beginning of the war have cost us much, and Americans, if they are as clever as they think they are, and we hope they are, will profit by them.

When America really gets over her blunders of the past year, and begins to turn out real aeroplanes and real aero-engines, she will have as fine a flying service as any in the world, especially when it is cut clean adrift from the old-fashioned, hide-bound Signal Service, which has held it in bondage so long. Even now in 1918, the American military authorities have not learned the lesson which we learned in 1912, when we found that the Corps of Royal Engineers was choking military aviation to death, and when, in consequence, the Royal Flying Corps was founded, to become, as it was when the Royal Air Force was formed, the finest fighting machine in the world.

Our Spare Machines.

Fortunately, good has come out of evil in another respect. All the good timber and fabric and steel and labour which was prodigally wasted in this country a year or so ago on making vast stocks of unnecessary school machines and engines, which have been lying in store month after month taking up much-needed room, now come in very useful for training American pupils who ought to be learning on American machines, but have none.

This happy result is no credit to the people who wasted the material in the first place, nor to the American Aircraft Production Board which failed to produce its own machines in the second place. It is just a piece of the amazing and entirely undeserved luck which hangs over this country.

In much the same way the huge superfluous stocks of recent type active-service machines can be used up in the field, without any being left over to be burned as obsolete, and so the newest of 1918 types will be in common use throughout the Air Forces just that much sooner. Which, again, despite the best intentions and worst achievements, as is our custom, will help to get on with the war.—C. G. G.

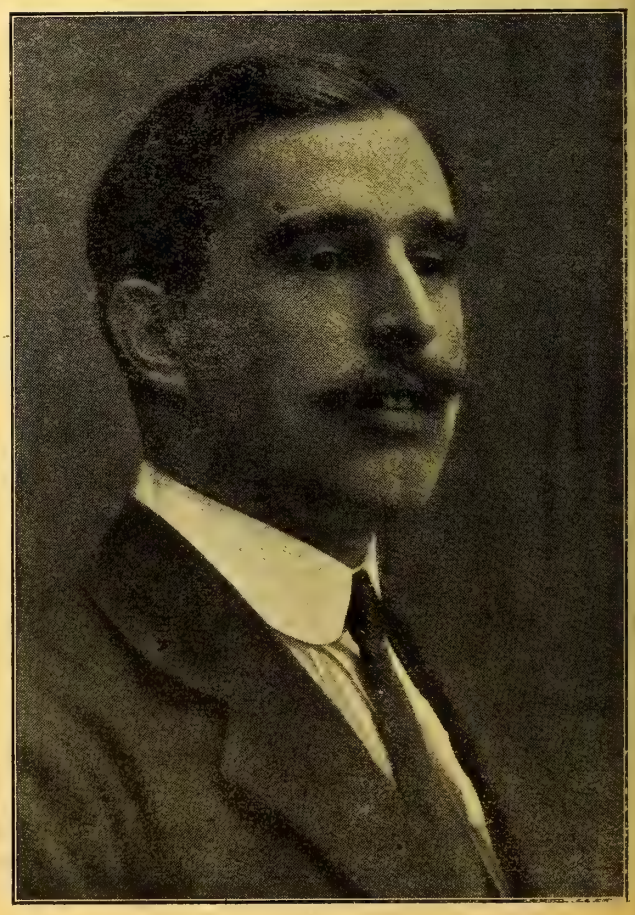
A GREAT ITALIAN PILOT.

All who were connected with international aviation in its early days will hear with regret of the death of Emilio Pensuti, who was one of the earliest and greatest of Italian pilots. For the past five years he has been chief pilot of the Caproni firm, and to his skill and experience is very largely due the development of the great Caproni multiple-engine biplanes and triplanes which have done so much valuable work in the war.

Pensuti met his death in a truly heroic manner which places him on a level with any other of the pilots who have died in air fighting. He was flying with an important Italian officer on board, when, owing to some insufficiently explained cause, the machine caught fire. In order to save his distinguished passenger Pensuti directed him to climb out on to the wing of the machine away from the fire, and he himself stuck to his post in the midst of the flaming body of the machine till he landed it correctly, and thus saved the life of his passenger. He died very shortly afterwards as the result of his burns.

If he had been content to let his passenger take the risk of being smashed, he might possibly have saved himself by letting go of the controls and climbing out along the wings in the hope that the machine would fall in such a way as not to kill him when it hit the ground, but this action would have lessened the chance of saving his passenger's life. Therefore, he made certain of saving the passenger even at the cost of his own life.

During his service with the Caproni Company he made over 3,000 flights on all types of that firm's machines. His death is an irreparable loss to Italy.



The Late Emilio Pensuti.

AIR MINISTRY CHANGES.

By an Order in Council which is published in the "London Gazette" of May 14th, it is provided that in future the Parliamentary Under-Secretary to the Air Council (now Major Baird) shall be Vice-President of the Council, and that the holder of that position shall no longer be appointed by the President from the two additional members of the Council.

The provision that these two additional members shall be included in the Council is annulled, and in substitution it is provided that there may be included in the Council such additional members, if any, not exceeding two, as may be appointed by the Secretary of State.

The Order also provides that the Deputy Chief of the Air Staff shall not be a member of the Air Council.

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)

THE ARMY OF THE FUTURE.

BY HENRY FORESTER.

In his book entitled "Deductions from the World War," and in the chapter on "The Army of the Future," the Baron von Freytag-Loringhoven devotes much space to an exposition of his views in regard to the supply and training of officers for the armies of the days to come. The rank and file of an army may on emergency be improvised from non-military personnel, and can be rapidly trained to a degree of efficiency which, while in no way comparable to that of the seasoned soldier, yet will be capable of making a fair showing on the field of battle. The officer, on the other hand, cannot be produced in a few days or weeks.

The Real Aristocracy.

The acquisition of the powers of leadership comes only from experience aided by the hereditary qualities of the ruling race. The army officer, if he is to attain and maintain the highest efficiency, must be of a class apart, a truth recognised for generations by the German nation.

"The spirit of German militarism, which has enabled us to stand the test of the World War, and which we must preserve in the future, because with it our world position stands or falls—which, moreover, is 'every whit as monarchical as it is aristocratic and democratic'—rests ultimately on the building up of an officers' corps which shall be thoroughly efficient for purposes of war. For this purpose a sound aristocratic tradition is of the highest value. . . . Aristocratic tradition, *in the wider sense*, is of the utmost service in the training of personalities. No profession stands in greater need of the latter than that of the officer" (pp. 146-7).

Not only is it necessary that the corps of officers in the future army as in the old should be recruited from the gentle classes of the country, but it is essential that its members should be highly educated not only in such matters as appertain to the art of war, but in all those arts and sciences which qualify men for a life in which breadth of mind is of primary importance. Neither birth nor education alone can give a man all that he requires to place him in a position of responsibility above his fellow-men, but they can, when united, justify his selection as an officer.

"He can and must strive to attain that 'harmonious combination of abilities' which Clausewitz declared to be the characteristic of military genius. Thereby he will guard himself against narrow-mindedness and the danger of that mechanical mode of thought which the predominance of technical science at the present day is apt to induce."

Military Study.

Our author further indicates the necessity for a special study of military history on the part of all officers. While there is little use for the scholastic officer, it is of vital importance that all who are set aside to lead men should be well read in all military subjects—and a warlike education covers most things in this world.

Whatever force it may be considered necessary to maintain in the days of peace, no opportunity should be lost by Great Britain of training a corps of officers considerably in excess of the numbers required for the peace establishment. Otherwise the wastage of war makes it necessary for the country to avail itself of the service of temporary officers whose training, brief as it cannot help being, is not sufficient to fit them for the stress of war and responsibility attaching to the command of even small detachments.

Staff Work.

This is especially so in the case of the General Staff. On the smooth working of the Staff—the perfect co-ordination of trained minds—depends everything in war. However brilliant the supreme commander may be, all his designs will be brought to nought if his Staff are not fitted for their work. No profession or business in the world is so exact a science as that of war. Each link in the chain of command requires careful forging, for the failure of one link can bring disaster as surely as can the disruption of all.

The present war began at a time when this country possessed a General Staff second to none in the world. The business of mobilisation and the transportation of troops to the front proceeded in perfect order and without delay or confusion. The more difficult task of expanding the army into a force comparable in size with those of the greater Continental Powers was also undertaken successfully, but only at the expense of the General Staff.

A General Staff cannot be improvised rapidly. Staff Officers had to be found for the new formations and for the enlarged War Office. Dilution of a kind unappreciated in the best Labour circles was resorted to in order that part of the army should have its due share of trained Staff Officers. Regular regimental officers were in great numbers added to the Staff, and others were obtained from outside sources. While a surprising degree of excellence has been attained under these somewhat adverse conditions, yet the result has not been so satisfactory as might have been expected had there been sufficient experienced Staff Officers to supply all formations.

Ersatz Staff Officers.

It should not be necessary to turn good civilians into poor Staff Officers. Business men, stockbrokers, journalists and the like, excellent though they may be in those walks of life for which they have been set aside in the scheme of things, cannot be expected to display the qualities inherent in the good soldier within a few months of their joining an army. Moreover, their minds have become so thoroughly imbued with the principles and practice of their own avocation that they are somewhat disinclined to adapt themselves readily to new conditions.

The battles of the Stock Exchange, the parade ground of a great emporium, the strategy of Fleet Street, are not good forcing grounds for the battlefields of Europe. The intriguing hand driving the facile pen in ways that lead to the ruin of a great general has no power to lead an army or a country to victory. Soldiers are necessary in the State, and it is therefore well that they should be skilled in their profession.

The Nation's Duty to Itself.

When the present war ceases it will be the duty of those in power to maintain the national defences at such a high level as to prevent the possibility of military failure in the future war. In addition, the maintenance of a large army in the days of peace reduces the expenditure in war to a high degree. Had, for instance, this country had a conscripted army, of a size equal to that of France, since the days of the Crimean War, the present national expenditure would be halved, and there would actually be a saving if the total expense of such an army for the sixty years of peace were compared with the cost to England of the present hostilities.

The Air Force.

The Air Force, which, by the consent of the Northcliffe Press, would appear to be the future Senior Service, will need but little reduction in peace time. The present combined strength of the Royal Naval Air Service and the Royal Flying Corps, while insufficient for the demands of war, is the minimum size necessary for the new Service in peace.

MANN EGERTON & Co.Ltd.

CONTRACTORS TO H.M. ADMIRALTY,
WAR OFFICE AND AIR MINISTRY.

Designers and Manufacturers of Proved Efficiency of all Types of AIRCRAFT

Head Office : NORWICH

SPECIAL DEPARTMENT
for the manufacture of
AIRCRAFT ACCESSORIES
(Strainers, Bolts and Nuts, etc., etc.)
177, CLEVELAND ST., LONDON, W.1.

MANN EGERTON & Co.Ltd.

LONDON NORWICH IPSWICH BURY ST. EDMUNDS.

It must not be forgotten that a nation can strike more swiftly and certainly with the aerial arm of its services than is possible with either the land or sea forces. In truth, a nation with an effective air force can take offensive action at a few hours' notice. The aerial arm can hold the day while the army and navy mobilise for their share in the war.

Therefore the necessity of mobilisation will no longer prevent surprise in the opening of hostilities. The decisive victory of a determined and vigorous primary offensive will be more marked than ever, and the maxims of Clausewitz will come to a closer realisation than even that great soldier expected.

The Task of the Air Ministry.

The work before the Air Ministry, now that the single air service is in being, will be vast in extent. Not only have all the difficulties of amalgamating the two services to be overcome, but educational establishments for officers must be formed and a suitable reserve must be organised.

No longer will Sandhurst, Woolwich, and the Staff College be available for officers of the Air Force. Therefore other means must be adopted for teaching flying officers those things which it is well that they should know. Instructors in the art of war as it affects the flying service must be obtained and a scheme of training and instruction devised. There is little doubt that the soldiers in whose hands lie the destiny of the Air Force are quite capable of directing that service in the paths of success.

The Future of the Industry.

There should be no slump in the Aircraft Trade when peace and its relaxations return. When those firms primarily devoted to other work relinquish the building of aircraft, and the firms which exist on inflated prospectuses and borrowed money collapse into the oblivion of discovered insolvency, those left in the Trade will barely be sufficient to meet the growing demand. The constant improvements in type necessitate a large programme of construction, quite apart from the constant replacements, consequent on periodic casualties.

Reserves.

While there can be no difficulty in the maintenance of a reserve of officers and pilots (assuming that in the future there will be an increase in the number of N.C.O. pilots and a consequent decrease in officer aviators) and of mechanics, it will not be quite so simple to create a reserve of matériel. The aeroplane and airship of commerce is not of great use for warlike purposes and is less likely to be as aeronautics progress. Therefore there will have to be created a large surplus of aeroplanes of late type as a reserve for the losses consequent on the first few weeks of war. This reserve will be regulated in size by the dimensions of the aerial fleets of foreign nations.

A Service to the British Empire.

The Baron von Freytag-Loringhoven will have achieved one purpose for his enemies (provided his book is well read) if the people of England can realise their responsibilities in regard to the formation and maintenance of a large Air Force, a large Army, and a Navy of sufficient size to keep enemy fleets within their home ports.

Expenditure of men and money must not be considered in the matter if the nation is to remain inviolate. Even the amelioration of the conditions of life among the poor and other measures of social reform must give way before the demands of defence. When once the military forces of the Crown have been put on a proper footing, then there will be time and money to spare for other things.

AIR FORCE RESULTS.

The following is a comparative statement of the number of bombs dropped by British aviators in France behind the enemy's lines, and of those dropped by the enemy in the area occupied by British troops, during April, 1918:—

	British.	Enemy.
(1) By day	17,867	687
(2) By night	6,033	1,346
Total	23,900	2,033

THE DEATH OF MR. J. GORDON BENNETT.

It is reported that Mr. James Gordon Bennett, proprietor of the "New York Herald," died at Nice on May 14th, at the age of 77, after a short illness which succeeded a series of attacks of pneumonia.

Mr. James Gordon Bennett was known chiefly to those concerned with aeronautics for his patronage both of ballooning and of flying. He endowed the International Balloon Race for the first three years of its existence with a trophy and a series of large prizes. The first race was held in 1906, the start taking place at Paris, the winner being Lieut. Lahm, an American pilot. Subsequent races were won successively by Germany, Switzerland, America, America again, France, and by America a third time.

At the first big public aeroplane competition held at Reims in 1909, Mr. Gordon Bennett offered a trophy for the greatest speed round a marked course, which was won by Mr. Glenn H. Curtiss on a Curtiss aeroplane. The trophy which was international in character was open for competition every year, under rules determined by the F.A.I. Congress, were held up to 1914, when the outbreak of war stopped the race which would have been held in the late summer.

The Gordon Bennett Cup was won in 1910 by Mr. Claude Grahame-White on an 100 h.p. Blériot monoplane at Belmont Paris, New York; in 1911, by Charles Weymann, on a 100 h.p. Nieuport monoplane for U.S.A.; in 1912, it was brought back to France by Jules Vedrines on a 140 h.p. Deperdussin, and kept in France in 1913 by Marcel Prévost on a 160 h.p. Deperdussin, who, for the first time in history, covered practically 125 miles round a closed course within the hour.

There is no doubt that the trophy and substantial prize which it carried which were provided by Mr. Gordon Bennett did much to stimulate the speed side of aviation, and the cultivation of speed for speed's sake. It is not very commonly recognised that for all practical purposes the 1912 and 1913 Deperdussin racing machines were the predecessors of the streamline type aeroplane which has been so effectively used by all belligerents. This being the case, it is really rather extraordinary that the Germans who, during peace time, did not possess a single aeroplane which could hope to win the Gordon Bennett race, should obtain something approaching a monopoly of fast aeroplanes during the earlier stages of the war.

THE DEATH OF EUGENE GILBERT.

It is with deep regret that one records the death of Eugène Gilbert, one of the pioneer pilots of France, who was killed while flying at Villacoublay on May 17th.

The old time students of aeronautics will remember Gilbert's consistent flying in peace time on all manner of monoplanes notably Blériots, Moranes, and Deperdussins.

One of his most notable performances was his unsuccessful flight for the Pommery Cup in October, 1913, from Villacoublay to Stettin, a distance in a straight line of 625 miles which he covered in 5 hours 23 minutes on a 160 h.p. monocoque Deperdussin monoplane, similar to that on which Marcel Prévost had won the Gordon Bennett race, a machine absolutely unsuited to cross-country flying, for on it a forced landing would have meant almost certain death. The cup was eventually won by the late Brindejonc des Moulinais, who flew from Paris to Warsaw on a Morane Saulnier monoplane, and who also was accidentally killed during the war.

On June 27th, 1915, Sous Lt. Gilbert was compelled to land in Swiss territory after a raid on the Zeppelin works at Friedrichshafen, and was interned.

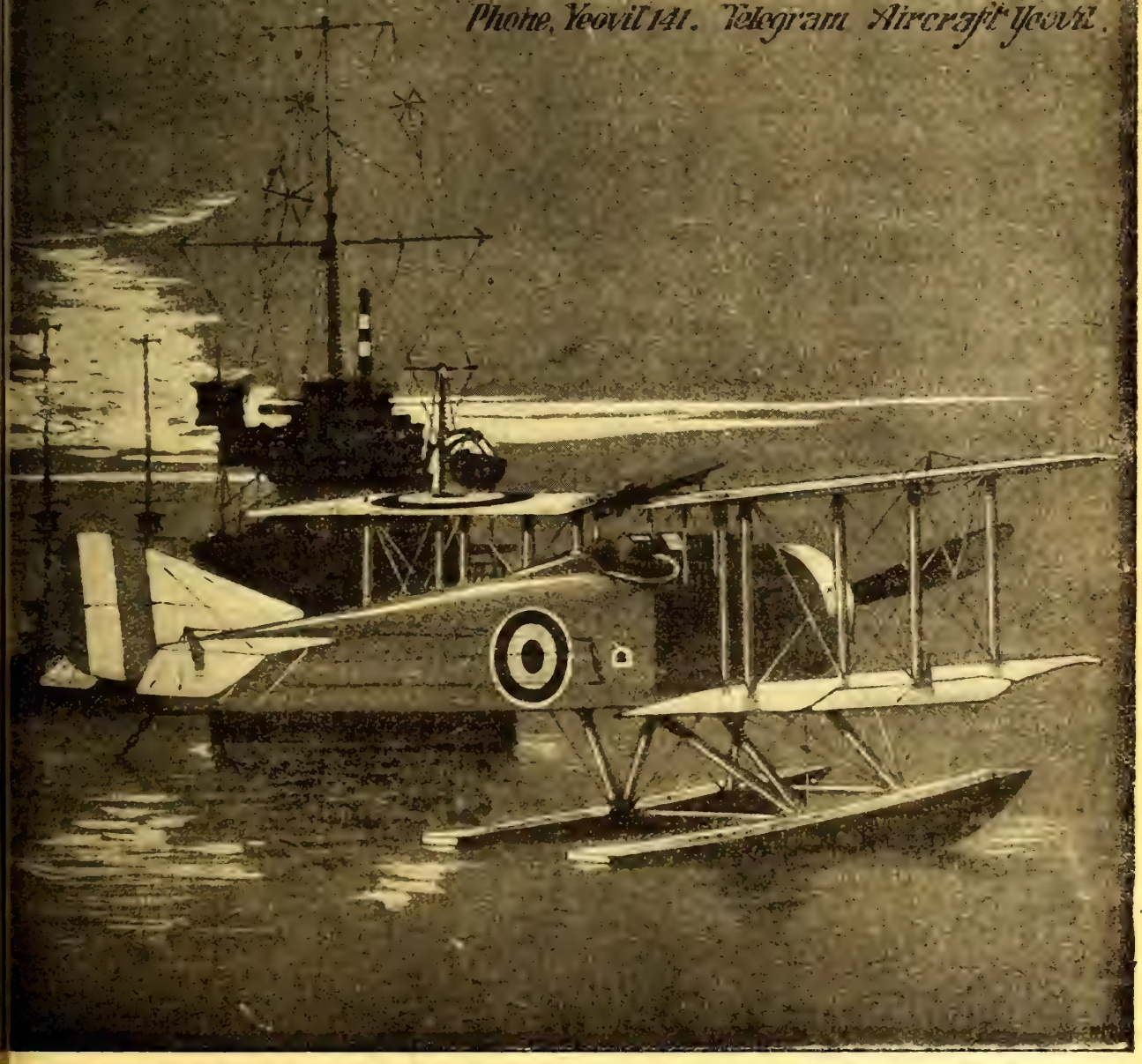
In the August following he succeeded in making good his escape. But the French Government sent him back to internment, as the letter Gilbert had written withdrawing his parole did not reach the authorities until after his escape. In February, 1916, Gilbert, not now on parole, and disguised as a woman, again eluded his guards, but he was discovered at Olten and sent back to Zurich. On May 24th of the same year Gilbert, for the third time, escaped. He got away from his prison on the 24th of that month, and six days later, in the guise of an aged and infirm peasant, he crossed into Haute Savoie.

Eugène Gilbert will be mourned by his compatriots and by those in this country who were associated with his early work as a pioneer who helped to make history.

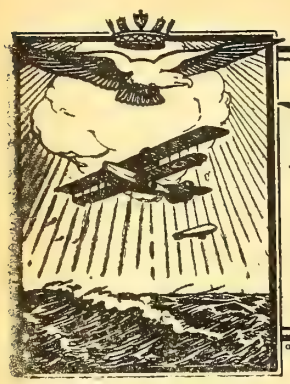
WESTLAND Aircraft.

WESTLAND AIRCRAFT WORKS.
BRANCH OF PETTERS LIMTD.
YEOVIL.

Phone, Yeovil 141. Telegram Aircraft Yeovil.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



NAVAL and MILITARY AERONAUTICS



FROM THE "LONDON GAZETTE."

War Office, May 13th.

The King has been pleased to approve of the following Awards to the following Officers and Warrant Officer, in recognition of their gallantry and devotion to duty in the field :—

The Military Cross.

Sec. Lt. F. N. S. Creek, Dur. L.I. and R.F.C.

He carried out several successful reconnaissances of enemy aerodromes and railways, and obtained valuable information often under the most difficult weather conditions. On one occasion he took several photographs of an enemy aerodrome though he was attacked by an enemy machine and subjected to anti-aircraft fire. He displayed the greatest skill and determination.

Temp. Sec. Lt. F. H. Davies, Gen. List and R.F.C.

Whilst on artillery observation duty he engaged a hostile scout, which he succeeded in sending down out of control. He then continued to observe for the shoot, and successfully accomplished his task. Later, whilst again on artillery patrol, though attacked by five hostile aeroplanes, he, by successful manœuvring, enabled his observer to fire several bursts into the leader of the formation, whose machine was seen to go down in a vertical nose dive and crash to earth. Continuing the fight against the remaining four hostile machines, he eventually forced them away, and succeeded in ranging on and neutralising three hostile batteries. He set a magnificent example of skill and determination.

Temp. Lt. A. L. Fleming, R.F.C.

He attacked a formation of three enemy machines, and forced the leading machine, which was a two-seater, to land, although the other two were attacking him from behind. He then attacked and destroyed another of the enemy machines, and engaged the third, which succeeded in escaping. He destroyed four enemy machines during one month, and showed splendid courage and skill on many occasions.

Temp. Capt. J. B. Fox, Gen. List and R.F.C.

During a period of two months he led his formation on six long-distance bombing raids into enemy territory. On the last occasion, though engaged by three separate hostile formations, he dropped his bombs with excellent effect over his objective, and brought the whole of his formation back to the aerodrome intact. His formation accounted for three enemy aeroplanes destroyed and four driven down out of control. He has carried out upwards of 40 successful operations, his skill and leadership being of the highest order.

Sec. Lt. W. L. Harrison, R.F.C., Spec. Res.

In aerial fighting, he destroyed two enemy machines and drove down others out of control. He always showed a splendid spirit of dash, keenness, and tenacity, coupled with determination and skill in attacking enemy aircraft.

Sec. Lt. (temp. Capt.) G. F. Hughes, R.F.C., Spec. Res.

While leading his formation over the enemy's lines he was attacked by 12 enemy machines, two of which he shot down. On the following day, when in charge of a patrol, he attacked seven enemy triplanes, drove down one out of control, and forced three others to land. On another occasion, while in charge of a patrol, he was attacked by a large number of enemy scouts; owing to his skilful flying his observer succeeded in shooting down one of the enemy machines, which broke up in the air. He always showed the greatest coolness and courage in action, and, as a flight commander, led his formation with splendid courage and determination.

Temp. Sec. Lt. P. A. MacDougall, Gen. List and R.F.C.

He always showed great initiative and skill in attacking enemy aircraft, and drove down or destroyed several enemy machines. On one occasion while on patrol he encountered three enemy two-seater machines, and, though his engine was giving trouble, he attacked them single-handed, and drove one of them down out of control, having shot the observer. On another occasion, after driving down an enemy machine, he attacked and silenced a battery of six guns which were firing on our machines. His example of pluck and determination was of the utmost value to the squadron.

Sec. Lt. (Temp. Lt.) J. F. N. Macrae, Gen. List and R.F.C.

While on an offensive patrol he attacked an enemy machine and drove it down damaged. On the same day he took part in a bombing raid at a low altitude on an enemy aerodrome, and secured a direct hit on one of the hangars. While returning he engaged enemy troops and transport on a road, causing casualties and confusion. He then climbed and attacked an enemy kite balloon, and, in spite of intense fire, succeeded in forcing it down damaged. He showed splendid courage and initiative.

Sec. Lt. (Temp. Capt.) M. E. Mealing, Shrops. L.I. and R.F.C.

In aerial fighting he destroyed three enemy machines and drove three down out of control. He also drove down an enemy balloon in flames. He always showed a splendid spirit of courage, keenness, and determination.

Temp. Capt. G. B. Moore, Gen. List and R.F.C.

He led a patrol to attack hostile balloons. The patrol drove down three balloons in a collapsed condition, one of which he accounted for himself. He has also destroyed three enemy aeroplanes and driven down three others out of control. He has always shown splendid courage and resource.

Temp. Sec. Lt. E. Pybus, Gen. List and R.F.C.

He carried out valuable photographic reconnaissances of enemy areas. Though on one occasion he was attacked by enemy machines, he succeeded in taking the required photographs. On three occasions, in the course of flights lasting four hours or more, he ranged a siege battery most effectively on hostile batteries, with the result that several gun-pits were destroyed and three explosions were caused. He showed splendid determination and initiative.

Temp. Sec. Lt. H. N. C. Robinson, Gen. List and R.F.C.

While on an offensive patrol he had trouble with his petrol pressure and was forced to turn back towards our lines. On his way back he saw seven enemy scouts attacking two of our artillery machines. He immediately dived on to the enemy and drove one of them down. During this operation one of his guns jammed. The enemy still continued the attack, and he again dived on them, but his remaining gun also jammed. Though both his guns were out of action and he had very little petrol left, he continued to dive on the enemy repeatedly and eventually drove them away. He showed splendid courage and resource.

Temp. Capt. E. R. Tempest, Gen. List and R.F.C.

He attacked a formation of seven enemy machines, firing one from a distance of a few feet and destroying it. On another occasion with his patrol he engaged 13 enemy machines. Though both his guns were out of action, he continued fighting for 15 minutes in order to enable the rest of his patrol to keep up the fight. Having driven off the enemy he brought his patrol back safely. He showed splendid courage and initiative.

Temp. Capt. J. L. Trollope, Gen. List and R.F.C.

During a period of three months he has engaged and brought down completely out of control four hostile machines, and has sent down crashing to earth three others. On all occasions he has displayed the greatest courage, determination, and skill and it is largely due to his fine leadership that the flight under his command has contributed so much to the marked success of his squadron.

Temp. Sec. Lt. H. J. Walkerdine, Gen. List and R.F.C.

Whilst escorting machines of another squadron, who were engaged on low bombing work, he encountered ten hostile scouts, two of which he succeeded in crashing to earth. He has at all times, by his conspicuous skill and gallantry, set an excellent example to his squadron.

Lt. W. L. Wells, Middx. R., and R.F.C.

On four occasions during three months he has been engaged with superior enemy formations, and has brought down con

(*Continued on page* 1921.)

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines like Rolls-Royce Cars are the Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, 2 BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (5 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

" " CONTRACTORS TO " "
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co. Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The British Aircraft Industry.

(SECOND SERIES.)

BY R. P. HEARNE.

XI.—F. W. BERWICK & CO., LTD.

For nearly twenty years it has been one of my hobbies to it factories in this and other countries. At the end of it I could , for myself, manage a village Punch and Judy show, but I ve the critical faculty of being able to tell a good factory from ad one.

had not been five minutes in the factory of F. W. Berwick l Co. when I asked my guide, Mr. F. W. Berwick, how long had been in America and Germany. To my astonishment he lied that he had never been in either country.

"But," I replied, "this tory plan is on the very best erican lines, and this rough organisation is more ial in Germany than in gland."

He merely smiled, and left with a further confirmation my theory that when we go right way about things in United Kingdom we can ep ahead of all our rivals. e tragedy is that we so sel- m go the right way about it, d splendid men and splendid aterials are wasted.

Contrasts.

When I come away from a e British factory, well nned and smoothly run, I an optimist of optimists, r I know the limitations of e Germans, and I know that ey cannot successfully com- te against the alliance which nks the brains and the uscles of the great western tions. But unfortunately you ve only to turn into some her British factory to find venliness, old-fashioned me- ods, rule of thumb, and pig- aded conservatism of mas- rs and men conspiring to hold back. Our slums are just rt of that wicked old indus- ial muddling for which we e now paying a terrible price. Contrast some old hole-and- rner factory, set in a sunless m, with a new building cing the open country. Instead of starved workers, housed in rk, cold, and unventilated shops, you have well-nourished rkers labouring in splendidly lighted, clean and well-ventilated d heated buildings.



Mr. F. W. Berwick.

A Sound Understanding.

It was the flooring that first attracted my attention at the Ber- ick factory. I am a faddist about factory floors since some ars ago a clever American engineer drew my attention to the matter. From very careful experiments it was found out that a rigid and cold floor is not the best for the workers.

To stand for many hours daily on stone or concrete is fatiguing, owing to the absolute hardness of the surface. Its coldness absorbs bodily heat and vitality, and, if factory heating is installed, more fuel is required to keep up the temperature of the building than would be the case if wood flooring were employed.

The shops of the Berwick factory are floored with pitch pine, and Mr. Berwick estimated that the saving in fuel alone more than compensated for the extra cost, leaving out the beneficial effect on the workers.

Light and Air.

I was next attracted by the uncommonly good lighting, due to the scientific planning of the roof. Very seldom indeed have I seen anything so good.

On the ventilation problem also I can class the Berwick factory as A1, and nowhere was the excellence of the arrangement more apparent than in the dope room. In the matter of doping I feel very strongly, for I have gone into dope rooms where it was torture to breathe. Although the poisonous element has been removed from dope, the fact still remains that the vapours given off are very pungent, not to say distressing. Looked at merely from the business standpoint it is not helpful to factory output to have the workers operating under unpleasant conditions, and it is a marvel to me how the women in some dope shops do any work at all.

Practical Science.

In the Berwick dope room there is a very well planned ventilation system, which keeps the atmosphere fresh and pure. As a refinement the room has its recording thermometer and hygrometer, and the readings of temperature and dryness of the air are taken as guides for the control of the ventilation.

A very effective method has been devised of holding the articles to be doped over draining and ventilating tunnels so that the drip, as well as the vapours, are carried away from the worker. It is by far the best dope room I have seen, and yet a newer and still better room is being prepared.

The whole of the woodshops and dope and covering rooms are protected against fire by the Grinnell Patent Sprinkler Installation.

A Model for Officialdom.

I should like someone to hammer into the heads of high officials in the Government the vital importance of encouraging the most up-to-date factory methods, especially in all work which may be injurious to health. And I can recommend these officials to take the Berwick factory as a model. Here we have an organisation planned for high efficiency, and yet its most notable features are the safety, comfort, and well-being of the employees.

Increasing Output.

And what is the result? Excellent output of very high quality. You can get high output by rush methods, but the pace is killing and quality is bound to suffer. The true test of factory efficiency is where you get quality as well as quantity.

Right through the Berwick factory I could trace a wonderful organisation, all aimed to bring about the truest efficiency. The offices are comfortable and well lighted and heated, and arranged on a sound plan. From the moment the factory worker clocks on he enters a building where he has every facility for giving his best work with the least waste of time or effort. Each main workshop has its progress department where a special staff keeps a close survey of the output, and a further analysis of these statistics puts the head of the firm in constant touch with the results achieved in the various production departments.

Inspection of Products.

In the main shop I also was much struck by the very fine viewing room, where the firm carries out its own searching tests of the work done. There was exceptional facility for keeping a very close check on quality, and hard by was a very nice little laboratory with men in it who knew their work. The equipment is excellent.

Camouflage.

After the war I hope to be still sufficiently remote from senile decay to write a few humorous articles. One of these efforts will deal with "dummy" factory laboratories and another will deal with factory first-aid departments.

I shall have some screamingly funny things to say about dirty little rooms filled with old bottles and antique scientific apparatus with cobwebs over them, these rooms being labelled "laboratories" for the purpose of impressing visitors of high degree. And of the red cross painted on the door of the fusty apartment known as the first-aid room, or "first and last aid," as some grim humorist has put it, I can also tell some curious tales.

But in the Berwick factory the first-aid room is a veritable miniature modern hospital, beautifully clean, fully equipped, and staffed by trained nurses.

Welfare of Employees.

Crossing the road from the main building I entered another section which it is a misnomer to call a canteen, so much ab is that word. The Berwick restaurant, as I prefer to name i made up of several comfortable compartments, one being a room for the heads of departments, another for office staff, a large hall for the general workers.

The whole arrangement for cooking and serving meals is ca out by the firm, and all the canteen employees are paid. I a great believer in the doctrine that every job should be paid and well paid too.

Production.

I have said very little about the products of this model fac but I may indicate that the firm turns out complete aeropl and make engines to one of the most complicated designs evolved. Yet so effective is the planning of work and the division of labour that even the engines are made to a very extent by women operatives.

Most elaborate care has been taken to minimise error, an this end the machinery, jigs, and tools have been given sp attention. Combined with these points we have the matt efficiency in every department carried to a science, and, have shown, the care given to the welfare of the worke another striking feature of this factory.

It is not surprising, then, to find that the work turned out the Berwick factory is up to a very high standard, and ne importance to that fact is the highly significant feature tha quantity production is very satisfactory.

Planning and Working.

I have attempted to show the chief merits of this n factory, the planning and working of which have filled me admiration. And now for a still more remarkable fact. T works were only commenced two years ago, and built by pr enterprise under war conditions. They were set running a ago on jobs which were quite new to the founder of the firn

I am not straining language thus when I describe Mr. F Berwick as an organising genius, for it is to him we ow creation of the Berwick factory. To motorists Mr. Berwi well known as the originator of the beautiful Sizaire-Berwick which a few years before the war aroused so much interest t splendid design and workmanship.

Originally the Sizaire-Berwick chassis was built in France it had been Mr. Berwick's plan to erect an English factory. outbreak of war delayed his efforts. Eventually in the fa great difficulties he succeeded in erecting a model fac and by another master stroke he quickly adapted this to duce for the nation some of the finest aircraft work turne in this country to-day.

And yet we have croakers saying that after the war we be beaten in enterprise and engineering by the Germans!

The Aero-Engine Fuel of the Future.

BY "DIOGENES."

I suppose that the views of the present-day pilot on the subject of fuels are that the very best is almost if not quite good enough for him, and that anything which falls short of the very best is absolutely beneath contempt.

This is all very well at the moment, and may continue to serve so long as the aeroplane is used solely as a weapon of war, provided only that the drain upon the fuel supplies is not such as to imply that the best fuel of to-morrow will be notably inferior to the best of to-day. The time is, however, coming—and we hope it is coming soon—when the extensive use of aeroplanes for other than sporting purposes will depend mainly on straightforward commercial considerations.

When that happens, we do not want to be absolutely in the power of the people, whoever they may be, who happen to have control of the highest grade fuel. Motorists know, to their cost, that even when there is not a war on, the quality of fuel has an uncomfortable habit of deteriorating, and they know also that so long as they allow themselves to be dependent on one particular fuel there is a very considerable risk of one less particular set of capitalists forming a ring, and doing just what they please with prices.

Post-War Fuel.

Of course, the average stuff that will be sold as petrol to the average motorist after the war will be something very much like what we used to call paraffin, or, at best, white oil.

If the aeroplane engine persists on being supplied with the very best spirit, that spirit may be forthcoming in limited quantities at an almost unlimited price. It will not, however, be marked down for the aeroplanes as its natural prerogative, but will only be bought in straight competition with anybody else, who may be prepared to pay the same or even a higher price.

Nowadays, the motorist is showing a strong disinclination to remain for everlasting entirely in the hands of the petrol suppliers. He is out to produce or evolve new fuels, which, even if they are not quite so good, will do fairly well, and will, at least, serve as a check on the price of petrol.

If aeroplane services, on the other hand, are to remain entirely dependent on supplies of the very best fuel, and are incapable of using anything else, then their fuel bill will presently become appalling, and all estimates of cost of operation will be to be upset at short notice.

Pounds, Shillings and Pence.

It may sound queer to talk of estimating cost of operati a time when nobody really cares what it costs to keep an plane in the air, and when engine efficiency and reliabilit infinitely more important than any pecuniary saving.

We must, however, face the fact that sooner or later we get down to pounds, shillings and pence. If one type of ma will show a saving of a penny or twopence a mile as ag another type, then, other things being equal, number one get all the business, and there will be no demand for nu two.

In those days the aeroplane will have more in common the commercial motor vehicle than with the ordinary moto The commercial vehicle has been obliged from the fir justify itself on an economical basis. The private car has been under an equal obligation. Doubtless, there will be sportsmen who will own aeroplanes for their own enjoyment the backbone of the whole thing, if we except the support the Government must give to a great military asset, will b commercial services for the carriage of mails and passenger

In any such services the difference between success and fa is a matter of fractions of a penny per mile, and, whethe like it or not, we shall have to get down seriously to the pro of making the aero-engine run well on a comparatively inf class of fuel, or else of evolving some totally new fuel which be produced cheaply and in ample quantities, however grea demand, and possesses all the essential qualities of the lig petrol.

Alternative Fuels.

Clearly, benzol and the various fuels broadly classed u that name do not offer any chance of the second possible tion of the problem. I will leave it to experts to determine far a heavy fuel of this class can ever be successfully use high altitudes.

The only big alternative to benzols and petrols is, so fa I am aware, alcohol. Alcohol alone is a bad fuel for sta up a cold engine, even at ordinary temperatures upon

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

And at
HENDON, N.W.9.

ground. At low temperatures and at great heights, plain alcohol would, I take it, be out of the question.

Moreover, no engine is really efficient with alcohol alone, that is not designed for a high compression and a low piston speed.

The most obvious way of using alcohol as part of a mixture is by combining it with benzol. These two mix well, which cannot be said of alcohol and petrol. Benzol will, however, mix with petrol, and so, by mixing all three, we may get a fuel of which a sufficient percentage is volatile at low temperatures.

Mixed Drinks.

I suggest, however, that a more promising field of investigation is that which concerns mixtures of alcohol with ether. I believe one such mixture was successfully used in an aero-engine some two or three years ago, and I can see no reason, though I am open to correction, why this class of fuel should not be quite satisfactory in this connection.

Ether is, of course, extremely volatile, so that there may be some risks of leakage and some dangers in storage. Assuming that these can be overcome, the ether in the fuel ought to enable it to start up an engine at any altitude and any temperature, and once the engine is well warmed up, there is no obvious reason why the alcohol should not maintain the good work by keeping it running.

In one alcohol-ether mixture to which a proprietary name has been given, the proportions are, I believe, about 35 per cent. of ether to 65 per cent. of alcohol. In other mixtures the percentage of ether is smaller, and a certain amount of benzol is introduced.

Denaturising.

In any case, it would, of course, be necessary to find a cheap and satisfactory denaturant which would make the fuel unsuitable for human consumption. This is by no means a simple problem.

We must remember that with aeroplane services connecting up all parts of the globe, supplies of fuel would have to be m tained in all countries. The ether could, doubtless, be got of without difficulty, leaving the alcohol in a drinkable condi We have to assume that we are dealing not with a man takes a drink because he likes it, but with a man who will drunk on anything which is not too horrible to swallow.

There are instances of people who do not shy at methyl spirits, which is nasty enough in all conscience. Moreover, have to consider not only the civilised man, but the savage, w tastes are not necessarily refined.

Unaccountable Tastes.

By way of illustration, I may mention what I believe is authentic instance. On a certain railway in Africa trouble experienced with hot axles. The trouble occurred with picious frequency in one particular district, and inquiries instituted. As a result, it was discovered that native labour either eating or drinking the axle grease, according to temperature and its consequent condition.

We have not as yet disposed of the good old theory that have no right to poison a confirmed drunkard, or even to a him to poison himself. The latter would be the simplest cheapest way of disposing of him, and would probably be for all concerned. However, it is not permissible. There our denaturant must not be poisonous, and, at the worst, only have violently emetic qualities.

A Problem in Economy.

To sum up, this is our problem. Given a man who will methylated spirit or axle grease with pleasure and is mad intoxicating drink, to provide a denaturant which, without ki him, will prevent him from absorbing alcohol.

This is really one of the toughest bits of the whole fuel alc problem, and I suggest that when we have satisfactorily so it alcohol will become the main part of the fuel upon which world's aeroplane services will come to depend.

How Not to Inspect.

BY "FULTONITE."

"Why inspect?" Thus the President, in his address to the Institution of Automobile Engineers, challenged the attitude towards inspection on the part of all firms engaged in war work.

Take, for instance, the pioneer work of the much-lamented Lieut.-Colonel Fulton, who died in harness after having conceived an Inspection Department worthy of the name. Colonel Fulton and his pioneer band of helpers started out with a praiseworthy effort to assist production, and not one of those early enthusiasts, who are now lost in the bewildering and chaotic monstrosity bearing the appellation of the Aeronautical Inspection Directorate, could be suspected of being one "who thinks he knows everything."

That condition of mentality, or super-mentality, followed later, and is now stultifying what should be one of the most helpful of Government Departments.

The original Aeronautical Inspection Department, under Colonel Fulton, was founded upon fine traditions, and soon earned the right to be considered "One of the few bright spots of the war" (vide The Aeroplane).

But soon tradition was trampled upon, and all sorts and conditions of men, and women, were ruthlessly badged into His Majesty's Service.

Instead of approaching the firms concerned with the vital provision of aircraft, as a help-mate, willing and ready with an efficient body of men to inspect and encourage, the newer Directorate tackled the job as Dictator.

The Proof of Failure.

Had the policy of Colonel Fulton been carried on, firms would have been capably relieved of all inspection, and could have devoted their entire energies to production. In the writer's opinion, which is backed by every firm of repute in the Kingdom, the proof that the Inspection Directorate has signally failed in its functions to provide manufacturers with a sound and reliable system of inspection is the fact that they themselves have been compelled to provide inspection independently.

The need for inspection was never at any time critical or universal; but what was required, and subsequently procured by the firms themselves, was a kindly process of education for those firms whose legitimate business was thrust to one side by the national need for aircraft.

By the merest chance, a firm found itself in the lucky possesion of a level-headed inspector experienced in the new class of work, but the vast bulk of the firms were left to grope their way under the cynical aloofness of their Government Representative, to educate themselves, and, worse than all, to withstand ignorant criticism, and, in many cases, obstruction.

The Need for Remedy.

These things are mentioned in the sincere hope that much will be remedied, even at this late time of day. That the remedy is sternly necessary, dozens of firms well know, and bitterly deplore.

The King's Service could have been so well served that f might have put the entire onus of inspection upon His accre representatives. As it is now, no firm dare wholly trust to standard of inspection set to them, and so they have been compelled, by sheer force of circumstances, to set up the exper machinery of an inspection department of their own, which many cases known to the writer, is more efficient and reli than that representing the purchasers, the British Taxpayer (chap)!

Why inspect? Firms could have been greatly assisted by intelligent transfer system of inspectors, as, for instance, sending of an inspector from a firm where he had already e rienced the inspection and manufacture of certain parts machine, to another firm just beginning similar work, an on.

Instead of that, round pegs in square holes seem to have the (one might almost say) studied policy of the Directorat

To illustrate the functioning of the Directorate, in so far a applies to itself, the following story well illustrates what follo

A proud mother brought her young hopeful to the Music centor of one of the great Cathedrals for examination as singing, and subsequent admission into the chorister's Coll attached to the Cathedral. The fateful test being over, youngster duly reported to his mother that he had failed. greatly upset, waylaid the Revd. the Precentor, and pleaded son's cause in such distressing terms that, adopting humanitarian policy that it is frequently necessary to be cruel be kind, his Reverence turned on the mother and barl "Madam, your boy has 90 per cent. breath and 10 per c voice."

And that is the present-day "functioning" of the A.I.D. ins tor, 90 per cent. clerk and 10 per cent. inspector.

Hence, the lamentable necessity for the thousands of mem of the A.I.D. staff, whose upkeep must now be costing the co try something like a sum equal to one and a-half millions ster per annum, a sum of money which would purchase nearly aeroplanes.

These are startling figures, the more so when one recalls emphasises the fact that there are dozens of young men in Directorate who could and should be doing much more effec service elsewhere.

AERIAL TRANSPORT.

A Reuter's message from Paris, dated May 14th, reported t Gen. Bongiovanni, head of the Italian Aviation Departm who is now in Paris, states that France, Britain, and Italy h come to an understanding with regard to aerial communicat between London, Paris, Nice, Rome, and Brindisi, and t this matter is now being thought out.

Gen. Bongiovanni is confident that all difficulties will be ov come, and that aerial postal communication between the Al will be instituted.



CELLON

(NON-POISONOUS)

DOPE

CELLON LTD.,

22, CORK STREET, LONDON, W.1.

Telephone—GERRARD 440 (2 lines). Telegrams—"AJAWB, REG, LONDON."

Contractors to H.M. Government.

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—VII.

BY C. SYLVESTER.
Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Carburetters.

A carburetter may be briefly described as a device by which petrol and air are converted into gas.

A carburretter consists of a float chamber, into which petrol flows from a tank. A small pipe, connected to the chamber, is fitted with a small nozzle or jet.

During the suction stroke of the engine petrol is drawn through the float chamber into another chamber, termed the mixing chamber. The petrol bursts from the jet in the form of a spray, and breaks into gas, which mixes with air from an air inlet, the mixture being drawn through the induction pipes past the inlet valves into the cylinder.

To understand the action of a carburetter clearly it is essential that the theory of carburation should be understood.

Carburation.

One of the problems which have kept the minds of inventors busy is the search for constancy in carburation, which will ensure the proper quality and quantity of mixture under the most varied circumstances.

The conditions to be fulfilled in order that an engine should work perfectly under all circumstances are very numerous indeed. It is necessary that the carburation should not only remain unchanged at all engine speeds and at all degrees of aperture of the throttle, which is essential for flexibility, but it is also necessary—

That the petrol consumption be as low as possible.
That the engine should always pick-up quickly.
That the engine should work smoothly at all times.
That the engine should start easily, when cold, without any trick or preparation.

These various qualities must all be obtained by means of such a device as will at all times secure the constancy of the results when once obtained. This latter condition is indispensable; otherwise the automatism will very soon become illusory.

Numerous solutions have been proposed up to now, but they offer little variety, as they almost all of them set at work mechanical devices actuated by depression, and complicated with opening air inlets for correction. Such devices are bound to be delicate, and likely to get out of order very easily, and even supposing their initial adjustments to be correct they cannot long remain so.

Why, then, are these adjustments for correct carburation necessary? Chiefly for the following reason:—In a spray carburetter of ordinary construction the speed of flow of each fluid, air, and petrol is not modified proportionately under the influence of the varying depressions. Effects of inertia come into play, producing an excess of petrol at high speeds and a want of it at low speeds.

Petrol Curves.

Take, for instance, the simplest type of carburetter, which consists of a single jet placed in the inlet pipe, from which the inrushing air sucks a varying amount of petrol according to the speed of the air as explained above.

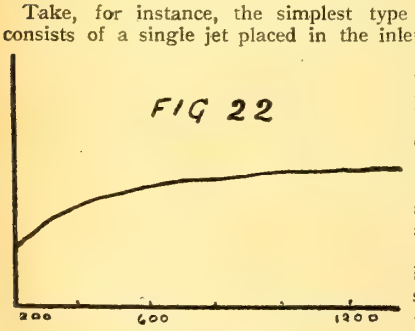
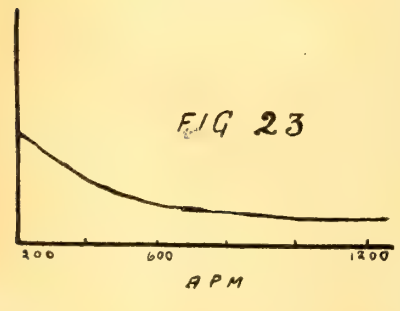
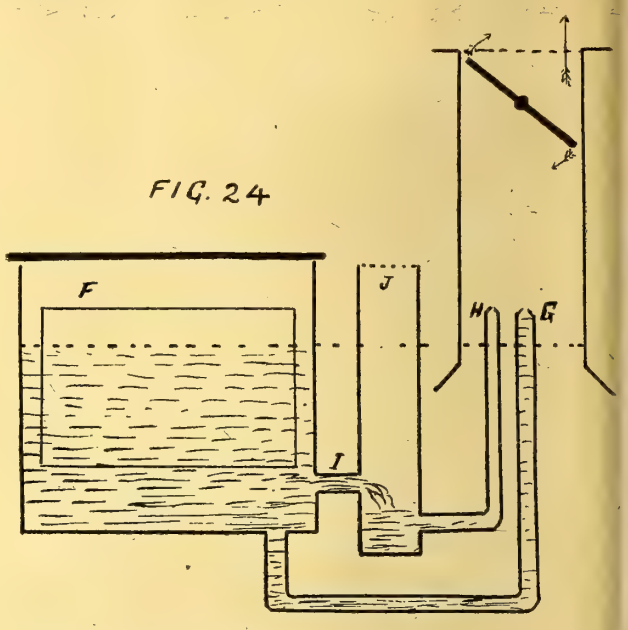


Fig. 22 illustrates the ratio of petrol to air at varying engine speeds.

The problem then to be overcome may be summed up as follows:—"To determine a second jet, the flow of which must be submitted to such conditions that the curve of the ratio of petrol and air will be inverse to that shown above, as illustrated in Fig. 23. This second jet may be termed a 'compensating jet.'"



We will now suppose these conditions are fulfilled, and that both jets work simultaneously. Now they will mutually complete and correct each other. That is, when one flows too much the other will be flowing too little, and inversely.



From this it will be seen that the conjugation of the two above curves leads to a straight line, which shows that the ratio of petrol and air will be constant at all speeds.

The Solution of the Problem.

An examination of the second curve shows that the compensating jet must have a constant flow for a given unit of time, this flow being independent from the suction within the carburetter.

The scheme illustrated in Fig. 24 shows how this condition has been fulfilled. To a jet of the ordinary type G, which draws petrol direct from the float chamber F, is added a compensating jet H, the latter having its origin at the bottom of a pipe J, which has its free end in the open air. The arrival of the petrol at the bottom of this pipe is regulated by a gauged orifice, the flow being determined only by the height of the column of petrol which weighs on it, which height is itself constant, owing to the principle of the float chamber F.

The section of J, being considerably larger than that of H, the result is that changes of pressure within the carburetter remain without influence over the flow of the petrol through the gauged orifice I, which therefore plays the part which the second curve shows to be necessary.

Carburation at High Altitudes.

It has been found that as an aeroplane ascends the mixture gradually becomes richer of its own accord. This is only natural, as in an automatic carburetter the mixture of air and petrol is practically constant at all engine speeds and at various throttle positions; or, in other words, the varying vacuum in the carburetter does not alter the strength of the mixture.

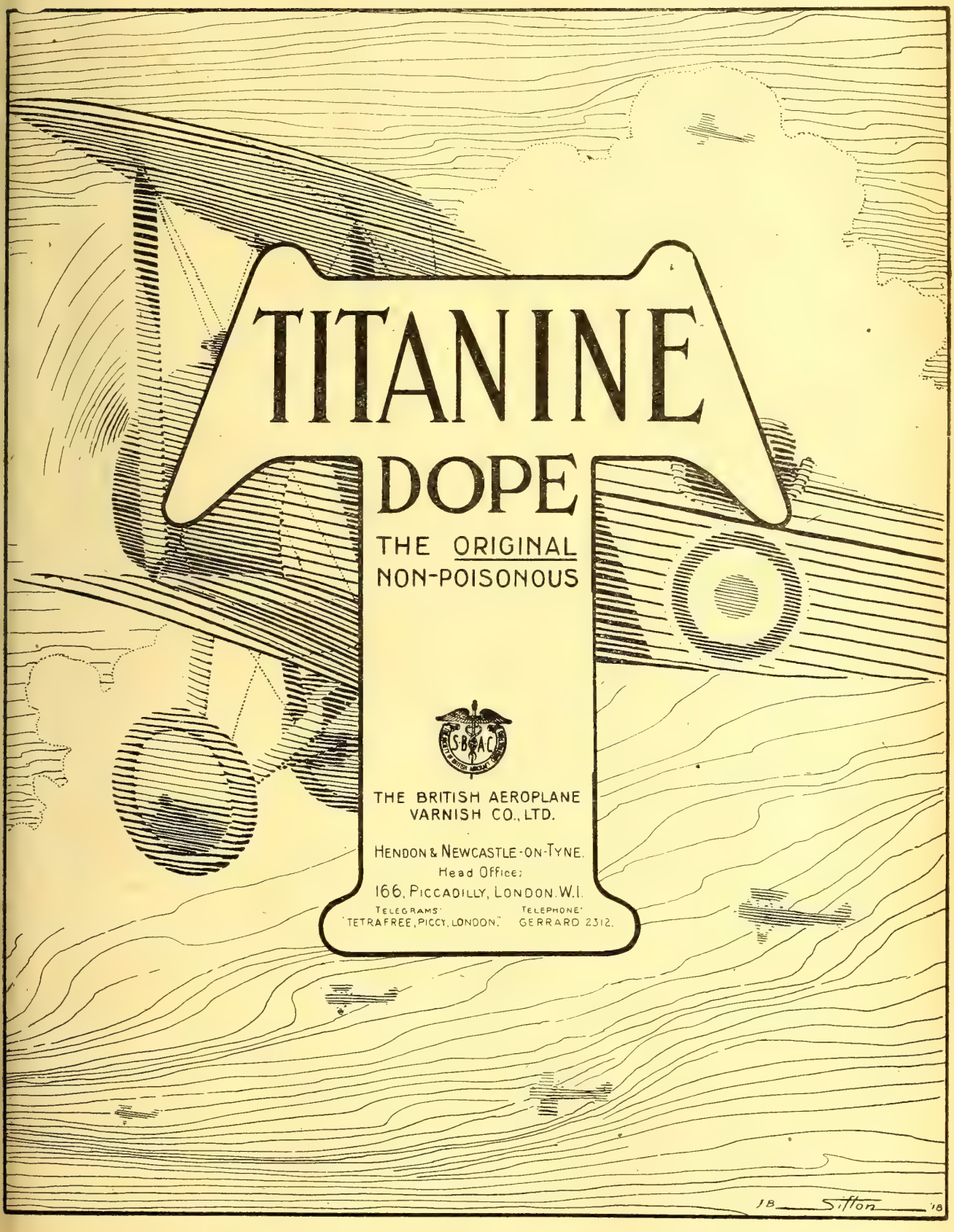
However, the composition of the mixture is not constant during changes of temperature or under varying atmospheric pressures.

It is a well-known fact that as the altitude increases the temperature of the air becomes lower, and consequently the weight of air per unit volume should increase. But the atmospheric pressure diminishes, which causes the density of the air to decrease.

This diminution of density is considerably more than the increase due to the drop in temperature, so that carburation is affected to an appreciable extent at high altitudes.

Regulation for Altitude.

Now, as is well known, the rate of discharge from the main jet, which is in direct communication with the float chamber, is according to the difference in pressure between the air over the float chamber and the air in the mixing chamber over the jet. This fact is taken advantage of to arrive at a means of varying the discharge from the main jet at will, so that it is only necessary to provide a means of altering the pressure over the float chamber and thereby vary the difference in pressure between the


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON. W.1.
TELEGRAMS: TETRAFREE, PICCY, LONDON.
TELEPHONE: GERRARD 2312.
JB Sifton '18

W. CANNING & Co.: Gt. Hampton Street.

And 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

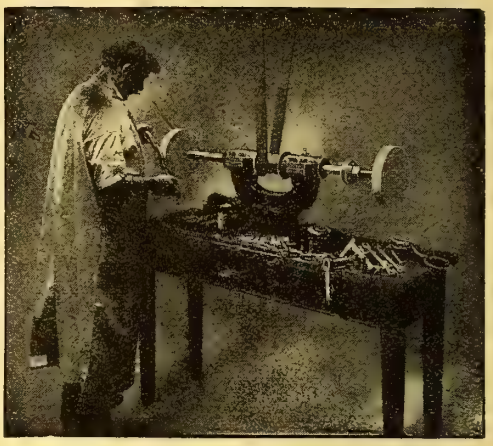


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

ACCLES & POLLOCK, LIMITED

MANUFACTURERS OF STEEL TUBING & PRESSWORK PARTS.

The Firm with the largest Aircraft experience in Tubular Components and Steel Presswork. Send us details of your requirements.

OLDBURY, BIRMINGHAM.

Telegrams: "Accles, Oldbury."
Code: A.B.C., 5th Edition.
Telephone: Oldbury 111 (4 Lines).

Trade Mark. ANKH *Means Long Life.*

SELSDON

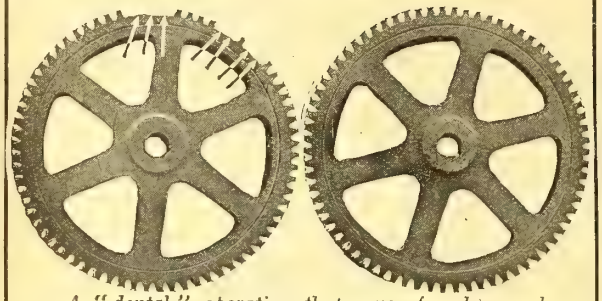
AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W.1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO, CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.



A "dental" operation that saves foundry work, prevents long stoppages and saves the cost of replacement.

This 7-cwt. Cast Iron Cog Wheel, which had several teeth missing, as shown in the left hand illustration, was very easily put right by Barimar. New teeth were welded in. These repairs when done by the Barimar Process usually give good service for years. Many testimonials have been received from customers praising the quality of the work in this class of repair.

"At the Head of the Industry in Britain."

"Barimar, Ltd., of 10, Poland Street, Oxford Street, London, W.1., a firm of scientific Welding Engineers, which is by common consent at the head of the whole industry in Britain——"

"Journal of Acetylene Welding."
Published in Chicago, U.S.A., December, 1917.

The article in the "Journal of Acetylene Welding," Chicago, U.S.A., gives some indication of what American experts think of Barimar methods. If you want to read the whole story, you will find it on pages 6 to 9 of the Barimar book—"The Welding Test."

How to get "THE WELDING TEST"

If you have any broken parts to be repaired, a copy will be posted free. If you want a copy just to see what it is all about, please enclose three penny stamps to pay postage. Kindly ask for Manual "B C" and mention THE AEROPLANE.

Barimar Welds all Metals

As the firm operates all systems of welding, it follows naturally that all metals can be welded by Barimar. A glance through the pages of "The Welding Test" will show what can be accomplished by the Barimar Scientific System of Welding.

Cut costs and send the Repair now

Barimar cannot quote for repairs without seeing the job. Do this: Remove all fittings, attach a label with your name and address and send the part carriage paid. Passenger train saves time. Then write to us fully giving all instructions.

Address your Repairs to Dept. "B C."—

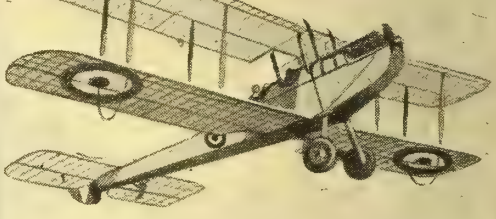
BARIMAR

LIMITED,
Scientific Welders of Unlimited Resource,
10, Poland Street, London, W.1.

Telegrams: Bariquamar Reg. London.
Telephone: Gerrard 81 7

Britannia Dope

TRADE MARK



Britannia Dopes
(NON-POISONOUS)
and Varnishes

FOR AEROPLANES AND SEAPLANES

FOR FULL PARTICULARS APPLY TO THE APPROVED MAKERS—

ROBT. INGHAM CLARK & CO. LTD.

WALTER HOUSE,
BEDFORD ST., STRAND, W.C.

Telegrams: "Pearline, Westrand.
Telephone: Regent 3923.

And at WEST HAM ABBEY, E.15
Telephone ... East 955 & 956

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY : 2 pints of glue.
LOADING : 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT : 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.

PULVO

However Loud We Screeched

in our advertisements we should not obtain customers, nor retain their confidence, if there were not a solid reason behind.

That reason is to be found in the reliability of PULVO work. Accuracy, good finish, and prompt delivery are the keynotes of PULVO policy.

We do not undertake what we cannot perform ; our promises are based upon our knowledge of our resources and capabilities, not upon our hopes of what we might be able to do. That is why we always claim in our advertisements, and always, at all times, everywhere,

What Pulvo promises Pulvo performs

The PULVO ENGINEERING Co. Ltd.

10, 12, 14 and 16, DANE STREET, and 95 and 96, HIGH HOLBORN, LONDON, W.C. 1.

Telephone : Holborn 410.
Telegrams ; Pulvipult, West-Cent.

H. & O., Ltd.

Harris & Others, Limited,

AIRCRAFT CONSTRUCTORS,

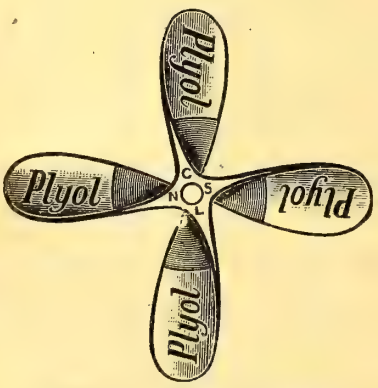
Old Town, Clapham, S.W.4.

Phone: Battersea {1238 1047

WOODWORK, METALS, COVERING AND DOPING.

Sub-Contractors to leading Aeroplane Builders.
On Admiralty and War Office Lists.

"PLYOL"
THE
BEST CEMENT
FOR
THREE-PLY,
Veneering, etc.



Registered Trade Mark.

ALDGATE CASEIN WORKS.

NIEUWHOF, SURIE & Co., Ltd.
HEAD OFFICE
5, Lloyds Avenue, London, E.C. 3.

And at
ALDGATE AVENUE, ALDGATE, E.C.

Also Casein especially adapted for Waterproof Paints, Varnish, etc.

Telephones
AVENUE 34, 35.

Telegrams:
"SURICODON, FEN LONDON."



CABLES.



OVERHEAD LINES.



MOTORS and GENERATORS.



SWITCHGEAR and TRANSFORMERS.

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E. 7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159W. George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

OUR EIGHT SAW MILLS, WORKS, ETC.

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS, — STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 300.
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).
Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.
Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London." Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1942 (3 lines)
Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7220
Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 612.
Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.
Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193.
Short Bros. Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 1688 (8 lines).
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3 "Vickerlyta, Knights London." Kensington 6810.
Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120.
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton Wimbledon 1314.
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London" Regent 378.

Aluminium Castings (Sand and Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings— Avenue 995, 996, and 7006.

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.
Palmer, F. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313
Rubery, Owen & Co., Darlaston, South Staffs.
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61.

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico, London, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1 Regent 2165
Dunhill's, Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)
Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard 2312
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280
Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg. London" Gerrard 440.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aerodight, Vic, London." Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1203
Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.
Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085.
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevenfold, London" Walthamstow 408 (2 lines).

Electrical Accessories—

Belling & Co., Montague Road, Upper monton, N.18. "Belling, Edmo Tottenham
Johnson & Phillips, Ltd., Charlton, L S.E.7. "Juno, London." Central 2207, London Wall
Mann, Egerton & Co., Ltd., 177, Cle Street, London, W.1. "Installing, road, London." Museu
Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. renheit, Birmingham." Midland
The Rotax Motor Accessories Co., Ltd. toria Road, Willesden Junction, N. "Rodynalite, Phone, London." Willesden

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, C try." Coventry
Johnson & Phillips, Ltd., Charlton, L S.E.7. "Juno, London." Central 2207, London Wall

Electric Lighting and Pow

E. Stanley Fardon, A.M.I.E.E., 67, M Street, Manchester
Johnson & Phillips, Ltd., Charlton, L S.E.7. "Juno, London." Central 2207, London Wall

Electro Platers and M Polishers' Engineers—

W. Canning & Co., 133-137, Great Ha Street, Birmingham. "Materials, mingham Birmingham 3622 Central (3

Enamel—

Silico Enamel Co., New Cross, London,

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, don, S.W.1. "Edibrac, 'Phone, Lon 3540 Victoria (3

Flexible Shafts—

Herbert Terry & Sons, Ltd., Red "Springs, Redditch." Reddit

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot lage, Bournemouth. "Etches, Winto Bournemouth
Cambridge School of Flying and Aerodrom 308, St. Andrews St., Cambridge. bon, Cambridge." Cambridge 5 and

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pav House, London, E.C.2. London Wall 573 and

Galvanising—

Boulton & Paul, Ltd., Rose Lane, Nor "Aviation, Norwich." Norwich

Gauges—

J. A. Prestwich & Co., Northumberland Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Birmingham "Mosgear, Birminghan East

Glue—

Cannon, B., & Co., Ltd., Lincoln, L Office, 110, Cannon Street, "Bececolin, Cannon, London." City
Improved Liquid Glues Co., Ltd., Gt. H tage Street, E (Croid.). "Exer Wapp, London." Avenue
Mendine Co., 8, Arthur Street, E.C. Bank
Oldroyd, Wm., & Sons, Ltd., 9, Mincing

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albe Street, Piccadilly, W.1. "Shatterless, London" Regent

Hack Saw Blades a Machines—

Victor Saw Works, Ltd., 2 and 3, Street, Finsbury Circus, London, Vicsaw, Phone, London." London Wall

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & Southwark Street, London, S.E.1. "Ki London" Hop 372 (2
Sturtevant Engineering Co., Ltd., 147, Victoria Street, London, E.C.4. tevant, London." Central 7121 (6

Hollow Spars—

McGruer Bentwood Hollow Spar Co., mercial Wharf, Lambeth, S.E. "Ga son, Watloo, London." Hop
Robert Young's Construction Co., Ltd., C bury Street, Essex Road, London, N.

Instruments—

British Wright Co., Ltd., 33, Chancery W.C.2. Holborn

Buyers' Guide.



ruments (Scientific, Alti-meters, etc.)—

Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge" Cambridge 642.

rt & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

neto Driving Pieces—

bert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

netos—

M-L Magneto Syndicate, Ltd., Coventry. "Corlton, Coventry." Coventry 1008-1009.

British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicks mag, Phone, London." Museum 430

British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

l Manufacturers—

ord, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham." Central 42-43.

ls in General— Avenue 1432

rie, J. B., & Son, 30, St. Mary Axe, E.C.3.

t & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 6065, 6066, and 7066

uel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

l Parts and Fittings—

es & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

oplane General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppiskout, Holborn, London." Holborn 4959.

raft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 Upcast, Rand, London" Gerrard 276 (2 lines)

tt & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2207.

iss, Jones & Bayliss, Ltd, Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.

kburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

sh Metal (Kingston), Ltd., Kingston-on-Thames

rie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432.

bard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

n, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.

ntford, Fredk., Lt., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261.

erson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3066.

ery, Owen, & Co., Darlaston South Staffs.

ey, Joseph & Sons, Ltd., Wellington Shropshire. "Sankey, Wellington, Salop." Wellington 66

Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.

Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

mpson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

bler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

l Shearing Tools—

ntgomery, Smith & Co., Ltd., Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

l Spinnings—

old & Sons, Lawrence Road, Tottenham, N.15.

ric Bolts—

lmore Bros., Hildreth Street, Balham, S.W. Battersea 415.

ery Owen & Co., Darlaston, South Staffs.

ellaneous—

erson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

den Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

ish Metal (Kingston), Ltd., Kingston-on-Thames.

wn Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.

bert Flood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

Lennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal Kingston), Ltd., Kingston-on-Thames

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Picc, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London" London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 723

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 24, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 201, Leeds

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts.

Foster Instruments, Letchworth, Letchworth 26

Radiators—

Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Galyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester" City 2432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—

Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury" Oldbury 111 (3 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4850.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4850

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart-West Bromwich." West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield "Firth, Steel field" Sheffield 3230 to 3237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham" Smethwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Daybur, Phone London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 1526.

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 476.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 60a, Borough High Street, S.E.1. "Buccaron, London." Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.



The Aeroplane Buyers' Guide.



Acceptance and Experimental Flights

The Premier Electric Heaters, Ltd., 39, Victoria Street, Westminster, S.W.1. "Premier, Vic, London." Victoria 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Lioltd, Phone, London." Victoria 1940.

Acetylene Welding Plant

Acetylene Corporation of Great Britain, Ltd., 30, Victoria Street, Westminster, S.W.1. "Thermic, Vic, London." Victoria 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Lioltd, Phone, London." Victoria 1940.

Aeroplane Manufacturers

Aircraft Manufacturing Co., Ltd., Hendon Aerodrome, Hyde, London. Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Action, Newcastle-on-Tyne." Gosforth 330.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellers, Leeds." Roundhay 345 (4 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., The (The Bristol Co.), Filton, Bristol. "Aviator, Bristo." Bristol 3077.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudron, Crickle, London." Hampstead 553.

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviation, Phone, London." Hampstead 4403 and 4404.

Dawson Aircraft Co., Ltd., 11, Grosvenor Road, S.W.1. "Dawsonair, Sowest, London." Victoria 7222.

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2894 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1126.

Grahame-White Aviation Co., Ltd., Hendon Aerodrome, Hendon. "Aviation, Hyde, London." Kingsbury 180.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydraphil, Crick, London." Hampstead 7222.

Hooper & Co., Ltd., 54, St. James's Street, Piccadilly, London, S.W. "Sackville, St. James, London." Regent 1234.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Marshall, Sons & Co., Ltd., Brooklands, Byfleet. "Marshsons, Westcrdg." Weybridge 311, Byfleet 171.

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Newport" Aircraft Co., Cricklewood, London, N.W.2. "Newaircraft, Crickle, London." Hampstead 3445.

Norman Thompson Flight Co., Ltd., Bognor. "Sopwith, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 247-252, New King's Road, Fulham, S.W.6. "Chobois, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8391, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consaun, East Cowes." Cowes 193.

Short Bros., Rochester, Eastchurch and Whitchall House, S.W. "Tested, Phone, London." Regent 178.

Sopwith Aviation Co., Ltd., Kingston-on-Thames, "Sopwith, Kingston." Kingston 1088 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Kennington Road Underground, S.W. "Vickerlot, Knights, London." Kennington 1800.

Wenger & Gillow, Ltd., Hammersmith, W. "Wenger, Ox, London." Museum 5900.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120.

White & Samuel & Co., Ltd., East Cowes, I.O.W. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1918), Ltd., Richmond Surrey. "Whitcraft, Richmond, Surrey." Richmond 1680.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships

Aerofilms, Ltd., High Street, Merton. Wimbledon 1514.

Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 178.

Aluminium Castings (Sand and Die)

Coan, R. W., 219, Goswell Road, London, E.C.1. "Krankases, Islng, London." City 2846.

Bent Timber Parts

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euspare, London." Museum 496.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 2927.

Blowpipes (Oxy-Acetylene)

Acetylene Corporation of Great Britain, Ltd., The, 30, Victoria Street, Westminster, S.W.1. "Thermic, Vic, London." Victoria 4830.

Brass Sheets for Tipping Propellers

Perry & Co., 36, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings

Avenue 693, 606 and 7000.

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

Palmer, J. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1413.

Rubery, Owen & Co., Darlaston, South Staffs. The Walfrey Co., Ltd., Salisbury House, London, E.C.2. "Wraithless, Phone, London." City 2681-2.

Cable Coverings and Cable Controls

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Carburettors

Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070.

Casein

Newsholme, Suric & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico, Fen, London." Avenue 34 and 35.

Celluloid (Non-Flam.)

Greenleaf & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing

Burberrys, Ltd., Haymarket, S.W.1. Regent 2163.

Dalbiac, Ltd., Euston Road, N.W.1. "Dunscud, London." North 3405-6.

Coloured Rags

Joseph, A., 1, Earl Street, London Road, Southwark, S.E.1. "New Mungo, Sedist, London." Hop 83, 301, 4272.

Component Parts

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 221 (4 lines).

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviation, Phone, London." Hampstead 4403 and 4404.

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681.

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Cords, Tapes, and Threads

Maclennan, J. & Co., 31, Newgate Street, E.C.1. And at Glasgow. City 3115.

Dopes

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312.

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulite, London." Regent 4046.

The British Emaluite Co., Ltd., 30, Regent Street, S.W.1. "Rubbeen, Piccy, London." Gerrard 386.

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg, London." Gerrard 440.

Clark, Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearson, Westrand, London." Regent 3023.

Engines and Parts

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Alex. Johnson, Ltd., Dumfries. "Motor, Dumfries." Dumfries 281-282.

The Bruce School of Flying, Ltd., The Broad Walk, Cricklewood, N.W.2. Hampstead 1020.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238.

Dudbridge Iron Works, Ltd. (Stimson), 87, Victoria Street, London, S.W.1. "Aero, Sights, London." Vic 7026.

Gordon, Wines & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Tamlow. Richmond 1203.

Gwynnes, Ltd., Hammersmith, W. "Gwynne, Hammersmith." Hammersmith 1040.

Napier & Son, Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8956.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolloyce, London." Gerrard 1634-36.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085.

The Gnome & Le Rhone Engine Co., Ltd., 47, Victoria Street, S.W. "Flevetold, London." Walthamstow 408 (2 lines).

Electrical Accessories

Belling & Co., Montague, [illegible]. Museum 5[illegible].

Johnson & Phillips, Ltd., [illegible], S.E.7. "Jono, London." Greenwich 1207.

Mann, Egerton & Co., Ltd., [illegible] Street, London, W.1. [illegible] road, London.

Premier Electric Heaters, Ltd., 39, Victoria Street, Westminster, S.W.1. "Premier, Vic, London."

The Rotax Motor Accessories Co., Ltd., Rotax Works, Willesden Junction, N.W.10. "Rotaxdom, Phone, London." Willesden 2480.

Electric Cables

E. Kulker & Co., Coventry. "Kulker, Coventry."

Johnson & Phillips, Ltd., [illegible], S.E.7. "Jono, London." Greenwich 1207.

Electric Lighting and Power

F. Smith & Co., [illegible], Smethwick, Staffs. Smethwick 1[illegible].

Johnson & Phillips, Ltd., [illegible], S.E.7. "Jono, London." Greenwich 1207.

Electro Platers and Metal Polishers' Engineers

W. Canning & Co., 133, [illegible] Street, Birmingham. "[illegible], Birmingham." Birmingham 4021 Central.

Enamel

Stilco Enamel Co., New Cross, London.

Flare Lights

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Febbrac, Phone, London." Victoria 1940.

Flexible Shafts

Herbert Terry & Sons, Ltd., Redditch, Springs, Redditch." Redditch 61.

Flying Schools

Bournemouth Aviation Co., Ltd., Hamble, Hampshire, South "Flytite, Hamble."

Cambridge School of Flying, [illegible], 308, St. Andrews Street, Cambridge. Cambridge [illegible].

Furniture (Office)

Cooke's (Finsbury), Ltd., Finsbury House, London, E.C. London Wall [illegible].

Galvanising

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

Gauges

J. A. Prestwich & Co., Northumberland Works, Tottenham, N.17.

Gears

Moss Gear Co., Ltd., Thomas Street, Bordesley, Birmingham. "Mungear, Birmingham." Birmingham 1[illegible].

Glue

Cannon, B., & Co., Ltd., Lancaster Office, 110, Cannon Street, E.C.4. "Beecolin, Cannon, London."

Improved Glue Co., Ltd., 14, Cleveland Cottage Street, E. (Trade only.) "Improglue, Wapp, London."

Membine Co., 8, Arthur Street, E.C.4.

Oldroyd, Wm., & Sons, Ltd., 6, Mosley Street, Manchester.

Goggles

[illegible] & Co., Ltd., 14, Regent Street, Piccadilly, W.1. "[illegible], London."

Hack Saw Blades Machines

Victor Saw Works, Ltd., 2[illegible] Street, Finsbury, London, E.C. "Victor, Vicsaw, Phone, London."

Heating and Ventilating

Chas. P. Kinnell & Co., [illegible] Southwark Street, London, S.E. "Kinnell, London."

Sturtevant Engineering Co., Ltd., 72, Victoria Street, London, S.W. "Sturtevant, London." Central 7[illegible].

Hollow Spars

McGruer, Benwood, Hollow Spar Co., 5[illegible] mercial Wharf, London, N. "Benwood, London."

Robert Young's Construction Co., [illegible] bury Street, East, Rotherhithe, London, S.E. "Youngsco, Rotherhithe." Rotherhithe 1[illegible].

Instruments

British Wright Co., Ltd., 22, [illegible], W.C.2.

Instruments (Scientific, Altimeters, etc.)

[illegible] Instrument Co., Ltd., [illegible] Instrument, Cambridge. [illegible] Cambridge 342.

[illegible] Ltd., Mayfield, Kew [illegible]. "Mayfield, Phone, Kew." Museum 180.

Magneto Driving Pieces

[illegible] Redditch. Redditch 61.

Magnetos

[illegible] Ltd., Coventry. "[illegible], Coventry." Coventry 1008-1009.

[illegible] & Ignition Co., Ltd., [illegible] Mill, Manchester. "Mabbs, Manchester." Manchester 2[illegible].

[illegible] Houston Co., Ltd., Lower [illegible] Street, Coventry. "Autocraft, Coventry." Coventry 276.

Metal Manufacturers

[illegible] Ltd., Birmingham. Central 4243.

Metals in General

[illegible] & Co., 31, St. Mary Axe, E.C.3. [illegible] Church Street, London.

[illegible]

[illegible]

[illegible] Mercer & Co., 108, Upper Thames Street, E.C.4. "Recorcided." City 0342.

Metal Parts and Fittings

[illegible] & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 221 (4 lines).

[illegible] General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zippsaur, Holborn, London." Holborn 4059.

[illegible] Sons & Co., Ltd., Acme Screw Works, Long Acre, W.C.2. "Screwdom, Rand, London." Gerrard 276 (2 lines).

[illegible] & Wilson, Ltd., Hatton Road, Wembley, Middlesex. Wembley 2205.

[illegible] & Brothers, Ltd., Wolverhampton. "Bolts, Wolverhampton." Wolverhampton 041.

[illegible] Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellers, Leeds." Roundhay 345 (4 lines).

[illegible] & Co., Ltd., Kingston on Thames.

[illegible] & Sons, 31, St. Mary Axe, E.C.3. "[illegible], London." [illegible].

[illegible] Rim and Tube Co., Lombard Street, Birmingham. "Lombardic, Birmingham."

[illegible] & Co., Ltd., Midland 211 (2 lines).

[illegible] & Co., Ltd., 11, Cleveland Street, London, W.1. "Instiffine, Rath, London." Museum 70.

[illegible], Fredk., & Co., Lifford, Birmingham. "Fremo, Birmingham." Birmingham 1[illegible].

[illegible] & Co., Ltd., Whitcombe Street, Regent 3946.

[illegible] & Co., Darlaston, South Staffs. "Steel, Darlaston." Darlaston 2[illegible].

[illegible] & Sons, Ltd., Wellington, Shropshire. "Sankes, Wellington, Salop." Wellington 41.

[illegible] Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Polishpit, Phone, London." Holborn 110.

[illegible] Aero & Motor Co., Ltd., 81, Albemarle Street, Piccadilly, W. "Sphero Phone London." Regent 1181.

[illegible] & Wilkinson Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Redonite, Phone, London."

[illegible] Willesden 2280.

[illegible] Bradley, Bilston. "Thompson Bros, Bilston."

[illegible] Engineering Co., Ltd., Old Oak Common Lane, Wolf[illegible] Junction, N.W.10.

Metal Shearing Tools

[illegible] & Co., Ltd., Keynsham, Bristol. "Ingenuity, Saltford." Keynsham 21.

Metal Spinnings

[illegible] & Sons, Lawrence Road, Tottenham, N.15.

Metric Bolts

[illegible] Bros., Hibbrith Street, Balham, S.W. Battersea 415.

[illegible] & Co., Darlaston, South Staffs.

Miscellaneous

[illegible] & Son, Ltd. (Roofsic, Belfast. "[illegible], Belfast." Belfast 4033-4034-4035.

[illegible] Wire, Ltd., Willesden Junction, [illegible]. Hayes, London.

[illegible], Wilbraham 2200 (3 lines).

[illegible] Metal (Kingston), Ltd., Kingston-on-Thames.

[illegible] Bros., Ltd., Great Eastern Street, E.C. "Rubrowned, Bilbrad, London."

[illegible] Food Co., Ltd., Chapel-on-le-Frith. "[illegible]." Chapel-en-le-Frith.

[illegible] & Co., 30, Newgate Street, E.C., and at Glasgow. Tapes, Cords and [illegible]. City 1115.

Motor Cars

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379, Old Tyburn Road, London, N.W.1. "Manegear, Lusroad, London." Museum 71.

Standard Motor Car Co., Coventry. "Hyallee, Coventry." Coventry 532-4 (3 lines).

Nameplates and Labels

Bristol Metal Engraving Co., Kingston-on-Thames.

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing."

Observation Panels

Improx Safety Glass Co., Ltd., 10, Norfolk Street, Piccadilly, W.1. "Shatterless, Piccy, London."

Parachutes

London, Regent 1550.

E. R. Calthrop's Aerial Patents, Ltd., Thorn Street House, Thorn Street, London, E.C. Sydenham, Ave, London. London Wall 3269-3267.

Pattern Making

Heath, Ward, & Co., 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4745.

Piston Rings

British Candle & Piston Ring Co., Coventry. "Candle, Coventry." Coventry 753.

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Obelisk, Sheffield." Sheffield 21494.

Plating, Nickel Silver and Electro Tinning

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies

Bliss, E. W., & Co., 24, Pentonville, Road, London, N.1. "Blissden, London." Hop 4340.

Presswork

Rubery, Owen & Co., Darlaston, South Staffs. Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellers, Leeds." Roundhay 345 (4 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

Elliott Propeller Co., 11 & 12, Sutton Place, Terrace, Kingston-on-Thames. "Lboro, Kingston." Kingston 672.

Integral Propeller Co., Ltd., "Airprop, Hyde, London." Hendon 9, Kingsbury 104.

Lang Propeller, Ltd., Westbridge. "Aerosticks, Westbridge." Weybridge 5[illegible] 521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

Odds, W. D., & Co., Leeds. "Airsaws, Leeds." Central 201, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. "Aircraft, Phone, London." City 8447.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 120.

Pyrometers

Yeovil. Yeovil 120.

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 26.

Radiators

Gallay Radiator Co., Ltd., 108, Great Portland Street, W.1. "Gallradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft

Craddock, Geo., & Co., Ltd., Wakefield, Portland. "Craddock, Wakefield." Wakefield 466.

Rubber Tubing & Accessories

Hancock, James, Ltd., 266, Goswell Road, London, E.C.1. "Manchester, Telfag, London." City 3811 and 3812.

Safety Belts

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Senloh, Manchester." City 2432.

Screw-driving Machines

Russell Bros., Redditch, Ltd., Tinkerworth, Redditch. "Inventers, Redditch." Redditch 74.

Seaplane Manufacturers

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellers, Leeds." Roundhay, 345 (4 lines).

Gosport Aircraft Co., Gosport. "Flight, Gosport." Telephone No. 217.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 637.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes

Bowser, E., 50, Park Lane, Leeds. Central 3473.

Searchlights and Landing Lights

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Lioltd, Phone, London."

The Rotax Motor Accessories Co., Ltd., Rotax Works, Willesden Junction, N.W.10. "Rotaxdom, Phone, London." Willesden 2480.

Shackles

British Gold Stud Ring Co., Ltd., Hounslow, Middlesex. "Goldstud, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Rotax Works, Willesden Junction, N.W.10. "Rotaxdom, Phone, London." Willesden 2480.

Sheet Metal Pressings

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 221 (4 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellers, Leeds." Roundhay 345.

W. H. Bristow & Co., Ltd., 52 and 52, Pall Street, Birmingham. "Bristol, Birmingham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aeroplane Co., Ltd., Westend Road, Acton, Hanwell 1[illegible]. "Lostprop, Ealing."

Ruby, Oates & Co., Tettenhall, South Staffs.

Sheet Metal Work

Acetylene Corporation of Great Britain, Ltd., The, 30, Victoria Street, Westminster, S.W.1. "Thermic, Vic, London."

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Rubery, Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 30, Victoria Street, Westminster, S.W.1. "Thermic, Vic, London."

The Salisbury Aero Co., Ltd., 5, Albemarle Street, Piccadilly, W.1. "Selsa, Phone, London." Regent 1181.

Arthur H. Tee & Co., Stevenage Road, South Kensington, W. Park 1443.

Small Tools

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosmall, Westcent, London." Museum 2955.

Sparking Plugs

Lodge Sparking Plug Co., The, Rugby. "Igniter, Rugby." Rugby 225.

Rinaldi, Leo & Co., Ltd. (Otto Plugs), 142, Pollard Street, W.1. "Repairit, Ring, London." Gerrard 7758.

Springs

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 342.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (4 lines).

Stampings

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4067.

Firth, Thos. & Sons, Sheffield. "Firth, Sheffield." Sheffield 2345 to 2347.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1932.

Sicklin, Bernard, & Co., Birmingham. "Bernard, Birmingham." Birmingham 224.

Steel Stamps and Markings

John Meerloo & Sons, Clerkenwell Street, Mitre End, E.C. "Dieter, Phone, London." Holborn 2[illegible] (2 lines).

Steel Tubes for Aeroplanes

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 221 (4 lines).

Taper Pins

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares

Maclennan, John & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber

Brown, R. F. & F. W., Wollaton, near Nottingham. "Brownwood, Nottingham." Nottingham 1526.

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euspare, London." Museum 496.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 22, Bucknall, High Street, S.E.1. "Buccaron, London." High [illegible] (2 lines).

BUYERS' GUIDE cont. on next page

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London" Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London" Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1305.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield" Attercliffe 95.

Washers—
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Lawrence Road, Tottenham, N.15.
Barimar, Ltd., 10, Poland Street, W.1. "Bariquamar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh" Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

By Royal Warrant of Appointment.

ESTABLISHED 1819.

ARNOLD & SONS,

Engineers and Instrument Manufacturers,

Sheet Metal Work, Sheet Metal Pressing, Stamping, Spinning, Acetylene Welding, Nickel Plating, Silver Plating, Electro Tinning, etc., etc.

LAWRENCE ROAD, TOTTENHAM, N.15.

Head Office: GILTSPUR STREET, E.C.1.

Telegraphic Address:—"INSTRUMENTS," LONDON. Telephone Nos.:—City Office: 5240, 5241, 5242 City. Factory: 2370 & 2371 Tottenham.

WADKIN & CO LEICESTER

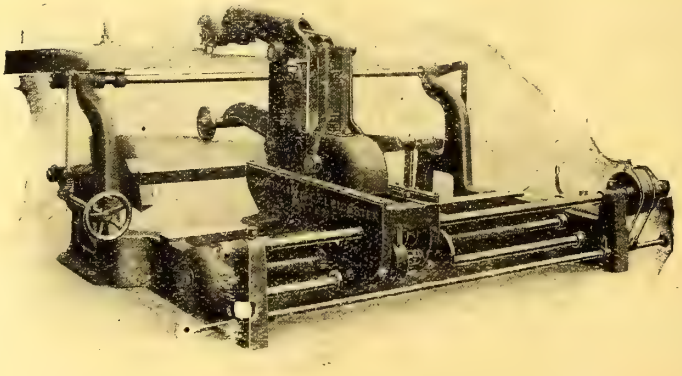
AUTOMATIC PROPELLER SHAPERS.

For Propellers having any number of blades.

Our latest machines have 2 speeds of traverse along the blade, viz.: 4½in. and 5¾ in. per minute.

An average size propeller can be shaped therefore in 30 mins.

Over 100 of these machines now in commission.



Made in 2 sizes to take propellers up to 12ft. and 14ft. dia.

Either machine deals with propellers 16in. wide and 9½in deep through hub.

PRICES.

12ft. type..**£282 10s.**
14ft. ,, **£309 10s.**

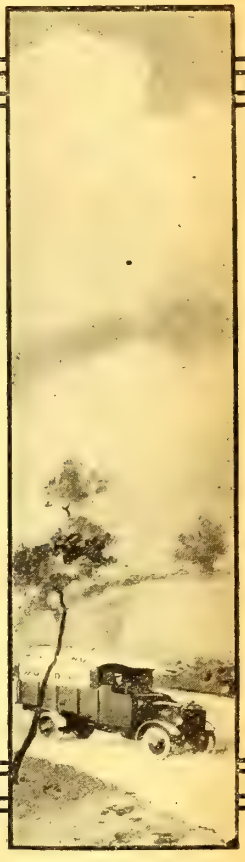
An important feature is that WOODEN FORMERS ONLY are required. These can be easily made in your own shop and make the manufacture of small quantities of propellers a paying proposition on our machine.

WADKIN & CO., LEICESTER.

Telegrams: "Woodworker." 'Phone Nos. 3614 and 5.



Allen's STEELS for AIRCRAFT AND MOTOR CAR CONSTRUCTION



Shrapnel-Proof Steel for Aeroplanes.

THE attention of designers is drawn to Allen's Shrapnel-Proof Steel for Aeroplane Chairs and other Armouring purposes.

This is a Special Alloy Steel of great toughness, giving protection with minimum weight.

Particulars on application. For general list of Aeroplane and Motor Steels, write for Catalogue D. (Post Free).

Edgar Allen & Co. Ltd.

Sheffield.

NIEUPORT

AND

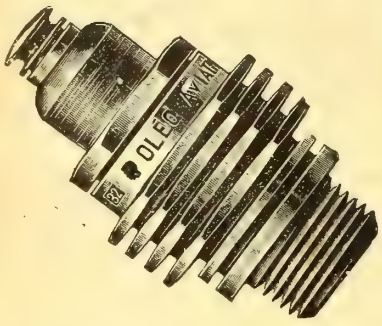
GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

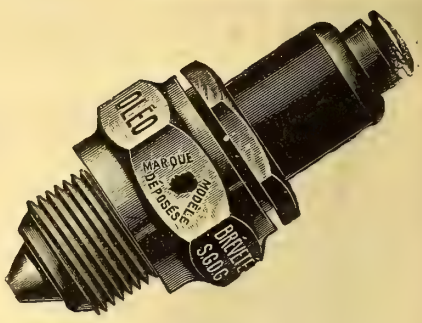
LANGTON ROAD, CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON







TYPE No. 32. "The Smile of Success." TYPE No. 27G.

OLEO were the first Aero Plugs ever made.
OLEO won the Aero Grand Prix SIX TIMES in succession.
OLEO Plugs have been supplied to the Government since 1913.
OLEO Aero Plugs have the "Largest Sale in the World."
OLEO Plugs have won over £30,000 in prizes.
OLEO Plugs were the first to Loop the Loop.
OLEO Plugs were the first to Cross the Alps.
OLEO Plugs are supplied to NINE Governments.

OLEO PLUGS

LEO RIPAULT & Co.
64A POLAND ST. LONDON, W.
TELEGRAMS RIPAULT REG. LONDON. TELEPHONE GERRARD 7758

WE CAN DELIVER—

A·G·S· Shackles

SIZES— (158) *—A, B & C.*

In any Quantities AT ONCE.

THE ACTUAL MANUFACTURERS

THE BRITISH GOLD SHELL RING CO., LTD.,
HOUNSLOW, MIDDLESEX.

Telephone; HOUNSLOW 254.

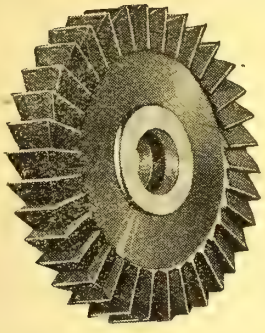
Telegrams, GOLSHEL - HOUNSLOW.

TWIST DRILLS



MILLING CUTTERS

QUICK DELIVERIES.



CENTRE DRILLS.

SEND US



YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,

32, Queen Victoria St., London, E.C.4.

'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.

AIRCRAFT DEPARTMENT



THE WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

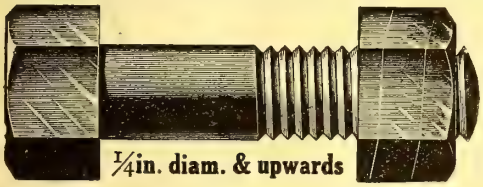
British Metal (Kingston) Ltd

Kingston-on-Thames

DIALS & INSTRUCTION PLATES
MADE IN ANY METALS,
IVORY, IVOROID, BONE, ETC.
ANY QUANTITIES, WORDING, DESIGN,
SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL
AIRCRAFT COMPONENTS
RIVETED, SWEATED, BRAZED OR WELDED.
R.E., F.E., B. & D, B.E., C-D-E,
SE, DE H.
RESIDENT A.I.D. EXAMINER.

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

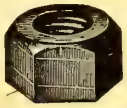
THE

"HELICOID" LOCK-NUT

(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅜in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.

WOLVERHAMPTON.

London Offices: 139/141, CANNON ST., E.C.4.

Bowden Wire Ltd.

TRADE MARK

London

THE varied uses and adaptations of the world-famous Bowden Wire mechanism and controls are recognised by almost every department of State Service. The war work which we have in hand for Home and Allied Governments precludes for the present our acceptance of private orders.

Established 1897.

Victoria Road Willesden Junction, N.W. 10.

CONTRACTORS TO H.M GOVERNMENT

W.T.CLARK & CO.



Telephone No. Central 2121.

5, GREEN TERRACE, ROSEBERY AVENUE, LONDON, E.C.1.

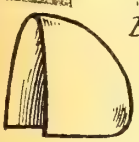
Telegrams Etalspinne Isling, London. Two Words

METAL SPINNERS
and
SHEET METAL WORKERS
for Aeroplane Constructors

METAL SPINNINGS for AEROPLANES

Cowlings (COMPLETE SET) Coverings Undershields

Fairings Petrol Tanks Shields etc.



BEATEN COWLS OF EVERY DESCRIPTION

SPUN COWLS UP TO 48 INCHES IN DIAMETER.



The Guardian Angel Parachute



RELIABILITY FIRST SECOND ALL THE TIME

E. R. Calthrop's Aerial Patents, Ltd.
Eldon St. House, Eldon Street, London, E.C.2

Telephone (2 lines)— LONDON WALL 3266 & 3267.

Telegraphic Address— "SAVEMALIVO, AVE, LOND ON.

HIGHGATE AIRCRAFT COMPANY LIMITED

NOTE:

Our Engineering Section can supply from stock Pressings for

AW., DH., RE., Etc.

Prompt delivery of Blankings or Fittings of any description guaranteed.

Capstan Work of any size up to 2 in. diameter and heavy Centre Lathe, Milling and Tool Turning undertaken.

QUOTATIONS ON RECEIPT OF DRAWING.

'Phone—2260 HORNSEY.

Pauntley St., Archway Road, HIGHGATE, LONDON, N.

Telegraphic Address: POETRY, 'PHONE LONDON.
Telephones: AVENUE 995, 996, 7996.

(Partners: H. W. PRITT, W. G. PRITT, P. W. SMALLWOOD, E. R. HILL),

PRITT & CO.

METAL WAREHOUSEMEN, MUNITION AND AERONAUTICAL CONTRACTORS

46, FENCHURCH STREET, LONDON, E.C. 3,

Where all communications must be addressed.

CITY WAREHOUSES: 62a & 64, Vine Street, Minories E.C.
DEPOTS: Paddington, Poplar, Shoreditch.

We hold good stocks, complying with Air Board, R.A.F. and Admiralty Specifications, of the following:

BRASS & COPPER in sheets, tubes, rod, wire, etc.
TINNED STEEL SHEETS.
MILD STEEL SHEETS, 9a.
BRIGHT DRAWN MILD STEEL BARS, 5a.
A. G. S. BOLTS, NUTS AND WASHERS.
COPPER RIVETS. TINMAN'S SOLDER.
SOLDERING IRONS.
BEST SWEDISH WELDING WIRE.
BRAZING SOLDER in wire and granulated Form.
SILVER SOLDER. WIRE GAUZE, &c.

All material passed A.I.D. before despatch.

DAILY DELIVERIES made by our own vans within a radius of 15 miles of our Warehouses.

NOTE.—All orders for Aeronautical Work receive especially prompt attention.

WE ARE BUYERS OF SCRAP BRASS & COPPER.

Bowden,

Controls, AND Cables FOR Aeroplanes

Suitable for all possible purposes. Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD., TYSELEY, BIRMINGHAM.

Tyseley

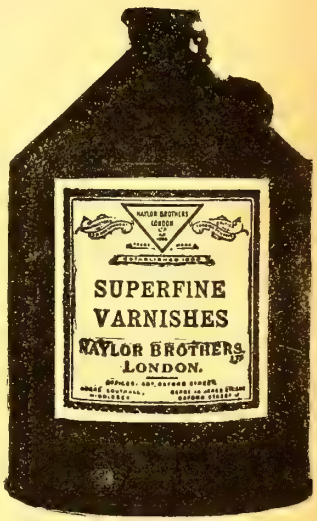
R.E.S.

THE USE OF

NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.
Contractors to all Government Departments.
Offices: 407/9, OXFORD S., LONDON, W.

PROPELLERS ONLY.

W. D. ODDY & Co.
LEEDS.

CONTRACTORS TO H.M. GOVERNMENT

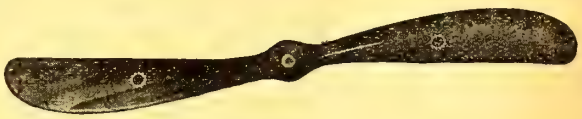
S.B.A.C.

Office—
Balm Road, Hunslet, Leeds.

Telephone—
Central 291.
Telegrams—
Airscrews, Leeds.

CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.

Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

Firth's Aircraft Steels.

Mark "A" Non-Magnetic
Bullet-proof Plates
For Armouring Aircraft.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

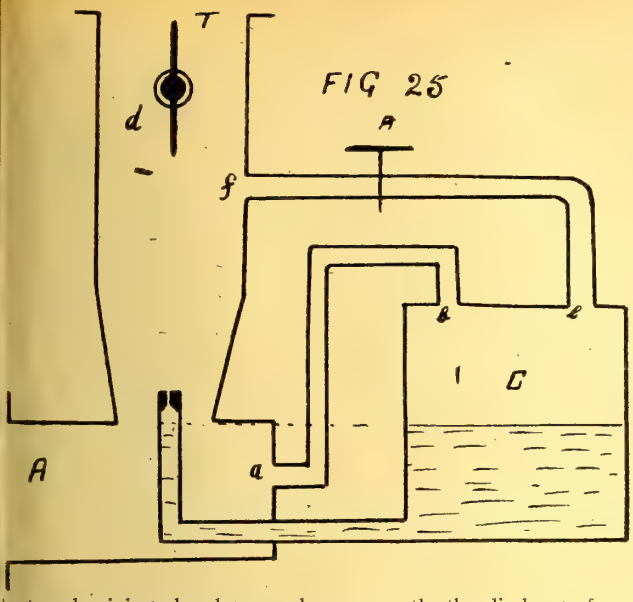


FIG 25

loat and mixing chambers, and consequently the discharge from he main jet alters accordingly.

To make this clear let us examine Fig. 25. This explains the rinciple of the Zenith carburetter which is extensively used on ero-engines.

In this diagram the float chamber is hermetically sealed. A ommunication *a b* is established between the top of the chamber nd the air inlet of the carburetter. A second communication *e f* oins the top of the float chamber to the mixing chamber, above ie choke tube, and a hand-controlled tap R is placed in this assage.

If we suppose our engine is running, there will be a certain epression or vacuum in the mixing chamber *d*, whilst in A the ressure will be that of the atmosphere, and the greatest vacuum ill be at the mouth of the choke tube.

In all cases the pressure at *a* will be greater than that at T ecause of the resistance offered by the choke tube to the flow of ir.

If the tap R is closed, the discharge from the main jet is deter- nined by the vacuum or depression at T, less the depression at C, hich at this time will be the same as at *a*.

Now, if the tap R is opened, we lower the pressure at C and becomes nearer to that which exists at T, and in this way he discharge from the jet is decreased, for the reasons stated efore.

In practice this arrangement is carried out by simply drilling assages in the body of the carburetter itself.

The third hole that will be seen inside the float chamber is o allow the compensating jet to work, at the same pressure as he float chamber.

As the carburetter is adjusted on the ground, with the tap shut, it is only necessary to open it more or less to correct the mixture at high altitudes.

A Practical Illustration.

The method adopted on the Salmson aero-engine is a small extra air valve fitted into the inlet pipe just above the carburetter. This is illustrated in Fig 26.

By manipulating the lever L one opens the valve S and lets a certain quantity of air into the inlet pipe, which reduces the suction on the jets in the carburetter and consequently reduces the flow of petrol from them. Therefore the pilot only has to move the lever L in order to correct the mixture at high altitudes, and a few trials will show how much this valve has to be opened.

This valve should never be used to increase the power of the engine, and it is quite wrong to surmise that the mixture is too rich because the engine runs faster when the valve is opened on the ground. Smaller jets must not be fitted on this assumption, and the valve should only be used for altitude correction.

Some Hints About Carburetters.

1. If misfiring takes place and explosions occur in the exhaust pipe, it is a sign of the mixture being too rich. This could be caused by a punctured float, or because the float needle is bent, or some foreign substance is resting on the needle seating which prevents the float needle closing properly.

2. Should the engine, after several minutes' running, overheat and gradually lose power, it is due to want of petrol. This could be caused by an inadequate petrol supply to the float chamber owing to the filter being choked up. Also a jet might be stopped up, or the petrol pipe itself might be blocked with dirt.

3. Short red flames from the exhaust indicate a weak mixture, whilst long blue ones are a sign of too much petrol. Should the blue flames dance about the exhaust and "go in and out" it proves the mixture is very rich, which a black exhaust is a sure sign of an extremely rich mixture indeed.

4. The inlet joints must be quite tight. Air leakage above the carburetter will increase the petrol consumption, reduce power, and cause trouble in starting the engine.

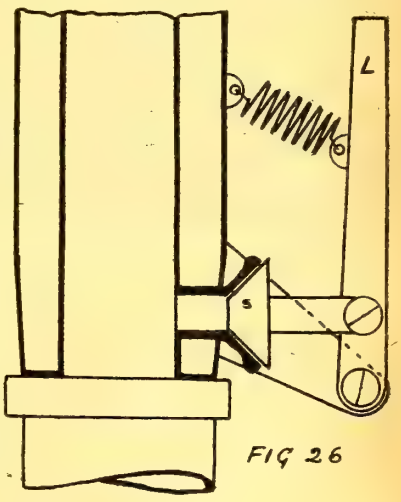


FIG 26

(To be continued.)

THE HISTORY OF DOPE.

Sir,—In view of the interesting discussion in these columns concerning the history of dope with the object of establishing who was the first to apply Cellulose Acetate dope to tighten fabric stretched over aeroplane wings, I should like to remark that so far as I am aware Eichengrün's patents contain no reference to this valuable tightening effect.

Eichengrün himself in a review of the chemistry of Cellulose Acetate published in Ullmann's Enzyklopädie der Technischen Chemie, 1914, volume I, page 128, attributes the first use of Cellulose Acetate solution for this purpose to Leduc Heitz and Co., while maintaining that an earlier patent of his own describes the kind of solutions used for this purpose. The translation of the passage is as follows :—

"Enamel-like Acetate layers on fabrics and on objects of all kinds are produced according to Eichengrün's process (D.R.P.254784/09) with the aid of viscous solutions which are prepared with the aid of mixtures of two or more non-solvents, and one or more solvents.

"This process was used for the treatment of the carrying surfaces of aircraft by the firm Leduc Heitz and Co. (E.P.229396, 1910 sic) (F.P.431692/1911 J.N.G.), while the same firm combined the Acetate coating with a Linseed Oil varnish covering according to F.P.446627/12."

To go into this subject thoroughly would involve a very lengthy discussion as to the validity of the patents relating to Cellulose Acetate solutions, and I will only observe that the Eichengrün patent for their general use on fabrics and on objects of all kinds, D.R.P. 254784/09, gives a reference to a still earlier employment of similar solutions.

Müller in his specification, F.P. 410205/08, mentioned by Mr. Bayley and Dr. Mond, does not claim the use of Cellulose Acetate solution in situ, which is the main point, but regards it solely as a proofing agent.

The embittered correspondence in 1913 between Austerweil and Eichengrün my be summarised by stating that Eichengrün claimed the Acetylcellulose solution itself and its general employment, while Austerweil claimed to have utilised for the first time the tightening and other effects obtained by applying the Acetylcellulose solution to the stretched fabric and regarded the composition of Eichengrün's solutions as already described in earlier patents.

(Signed) J. N. Goldsmith, M.Sc., Ph.D., F.I.C.

THE NORWEGIAN AIRCRAFT SHOW.

A correspondent of the "Times," writing from Christiania on May 2nd, says :—

To-day, in splendid weather, the King opened the first Northern aircraft exhibition. The Queen, the Crown Prince, and a great number of officials were also present. The exhibition shows the advance made in the Northern countries in this sphere of activity. While the Royal party were inspecting the exhibition a number of machines were in the air.

An official dinner was given in the evening, and the distinguished company included the Prime Minister, the Foreign Minister, the Swedish and Danish Ministers, the President of the Storting, and a number of authorities.

After the President of the exhibition had proposed the toast of "The Northern Kings," the Prime Minister spoke on the advantage of aircraft to the intercourse of the Northern Kingdoms. There is lively interest in aircraft everywhere, especially in regard to traffic to the West.

THE NEW HALBERSTADT.

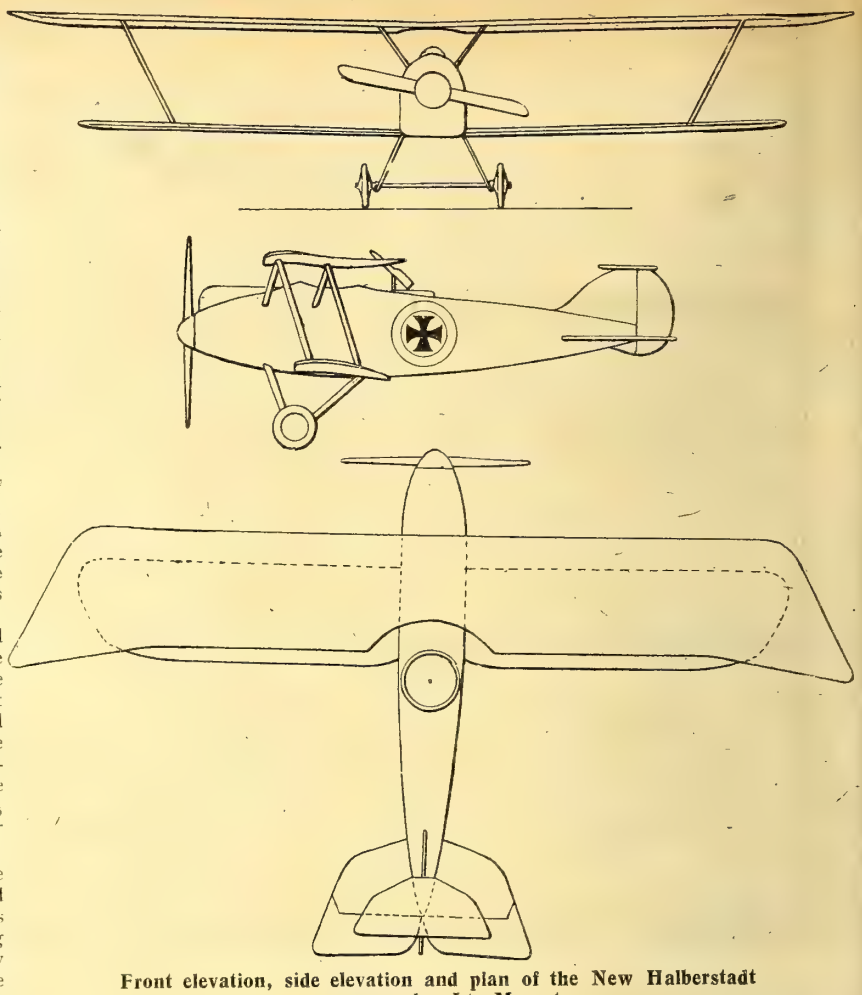
Writing in "L'Aerophile" of 1st-15th March, M. Lagorgette states that the Hannover biplane to which reference was made in this paper recently is almost certainly not a Hannover but a Halberstadt. Several of these curious machines with biplane tails have been shot down at one time or another, but have been so badly wrecked and burnt that it has not been possible at the time of writing to reconstruct a complete machine, but nevertheless the particulars given on the accompanying sketches give a fair idea of the general aspect and dimensions of the machine.

Together with these sketches are published other sketches of the same or a similar machine observed from the ground by Lt. Mussat, commanding a battery of mobile anti-aircraft guns.

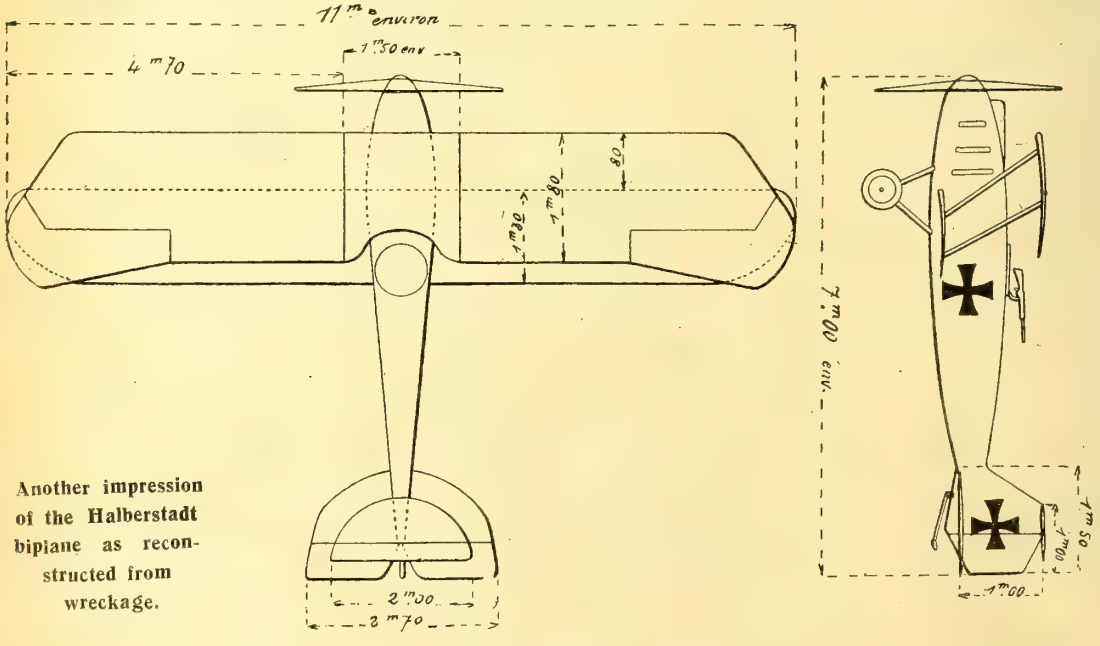
Lt. Mussat insists that the fuselage of the machine is extremely deep, and M. Lagorgette suggests that as no trace of a cabane has been found in the wreckage of the shot-down samples, the upper planes must be fixed direct to the top of the fuselage, and as in the Roland.

Observers on the ground, both French and English, as well as pilots who have come across odd examples of this machine, state that it has a very high ceiling and great speed, and that it is only found singly and at great altitudes. This rather confirms the idea that the machine is actually a Halberstadt, because the Halberstadt Company have always specialised on high-speed machines, and, being a comparatively small firm, their output is not very large.

It would appear that this particular type of machine is used for the particular kind of reconnaissance on which the Germans have specialised for some months past, using for it either this type of machine or the new Rumpler with the Maybach engine. These machines cross the lines at a very great altitude, generally in the region of 20,000 feet, always carrying oxygen for the use of pilot and passenger. They travel to considerable distances behind the French and British lines, apparently with the intention of photographing certain specific points, and owing to their immense altitude they generally pass unnoticed except by pilots who specialise on high patrol work. On reaching their destination they apparently do a long dive to their objective, take their photographs near the ground, climbing at once to the 20,000 ft. level and returning unseen.



Front elevation, side elevation and plan of the New Halberstadt as seen by Lt. Mussat.



Another impression of the Halberstadt biplane as reconstructed from wreckage.

OFFICIAL ENCOURAGEMENT.

A lecture was given under the auspices of the Air Ministry on Tuesday, May 14th, at the Town Hall, Fulham, to the staff and employees of the Regent Carriage Co.

The large hall was practically filled, and the Lecturer, Lt. George, R.A.F., had a most enthusiastic audience, being repeatedly applauded. He spoke for well over an hour and a half, giving a description, illustrated with lantern slides, of the various types of machines manufactured by the Company.

He also spoke of the magnificent work done by the R.A.F. on the various fronts, where he had himself flown.

ON WOODWORK JOINTS.

The Directors of Evans Bros., Ltd., publishers, London, announce the publication of a handbook on woodwork joints, describing the different kinds of joints in timber work known to carpenters. In the nature of things ordinary carpentry does not enter into the construction of an aeroplane, but there are so many purely carpentry jobs always on hand in an aircraft works that such a book should be of distinct value. Copies of the volume may be obtained from the Rolls House Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4., price 3s. 9d., post free.



ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

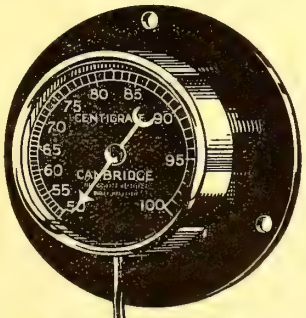
TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD

AEROPLANE

Length of Scale 4"
Diameter of Dial 2"
Weight with 10ft. of Copper Tubing 16ozs.

Length of Copper Tubing and Temperature range to Customer's requirements.



RADIATOR THERMOMETER

Manufacturers of all Types of Temperature Measuring Instruments for Industrial and Scientific purposes.

also
Aeronautical Instruments
Engineering Instruments
Electrical Instruments
Physical Instruments
Physiological Instruments

CAMBRIDGE
ENGLAND

Telegrams: INSTRUMENT-CAMBRIDGE
Telephone. CAMBRIDGE No. 615 (2 lines)

An Aircraft "Dabble."

I am a "dabbler"—that is to say, I dabble, dabble in anything that comes along; therefore I am generally "in" whatever there is going.

I have dabbled in almost everything. Shipping, railways, hotels, mining companies, rubbers, and many other things that lend themselves to dabbling. My latest dabble is aircraft manufacture, and of all the dabbles I have dabbled in, aircraft manufacture is the one, it, and all the rest of the family.

There have always been difficulties in dabbles. In mining it was either water in the mine or the shares, or the fairy tales of the mining engineer. The untruthful are classed as follows: liars, damn liars, and mining engineers; while a mine is generally a hole in the ground owned by a liar.

In rubber dabbles, the trees sometimes will not grow or are ungetatable, and so on.

As this article is not one on dabbling generally, but on aircraft manufacture dabbling in particular, I will not go into the beauties of dabbling, suffice it to say no dabble has ever been made difficult by the purchaser of the commodity produced by the mine, railway, rubber, etc., etc.

That is where the aircraft manufacturing dabble is unique. Every dabble I have gone in for meant there was a demand for the commodity dabbled in, and after due consideration I decided there was a demand for aircraft.

It will be noted I write in the past tense, for I am convinced that actually there is NO demand for aircraft, and I speak from experience. There are reasons, sound reasons, for my conclusions. They may be disputed, but facts and official documents are stubborn things.

It is easy to get orders for the manufacture of aircraft from the Government, but these orders are only subterfuges. They cannot be executed, the Government see to that.

With one hand they give an order, and with the other and both feet they see that it cannot be executed. Let me recount what actually happened.

I turned my mind to aircraft. "Surely there is a demand," said I. I had read about it in the "Daily Wail."

But the "Daily Wail" seems to be like the mining engineer, both however survive, and I was gulled by them.

"The country wants aeroplanes," I read, and decided I would do my bit in that respect.

"The ideal factory for the manufacture of aircraft is a piano works."

Right! So I found a piano works that was practically idle. Some filthy lucre, and the works were mine for the war. So far, good.

Of course being only a dabbler, I did not propose to manufacture aircraft myself. No; that was left to experts.

More lucre and these gentry were at my service. They knew all there was to know about manufacturing. Their credentials were high, so were their fees, but I did not mind that. A labourer is always worthy of his hire.

My works pleased them, they talked glibly about dopé, spars, presses, A.I.D., etc., while I stood by looking wise and holding the cheque-book.

Now said Expert No. 1, "I'll show how to get orders," and he did. Class "A" certificates, accompanied by orders for the manufacture of over 1,000 parts of aircraft, were produced in a few hours.

These orders were given by firms whose stability was beyond question, and I was simply dumbfounded at the ease with which the expert obtained them.

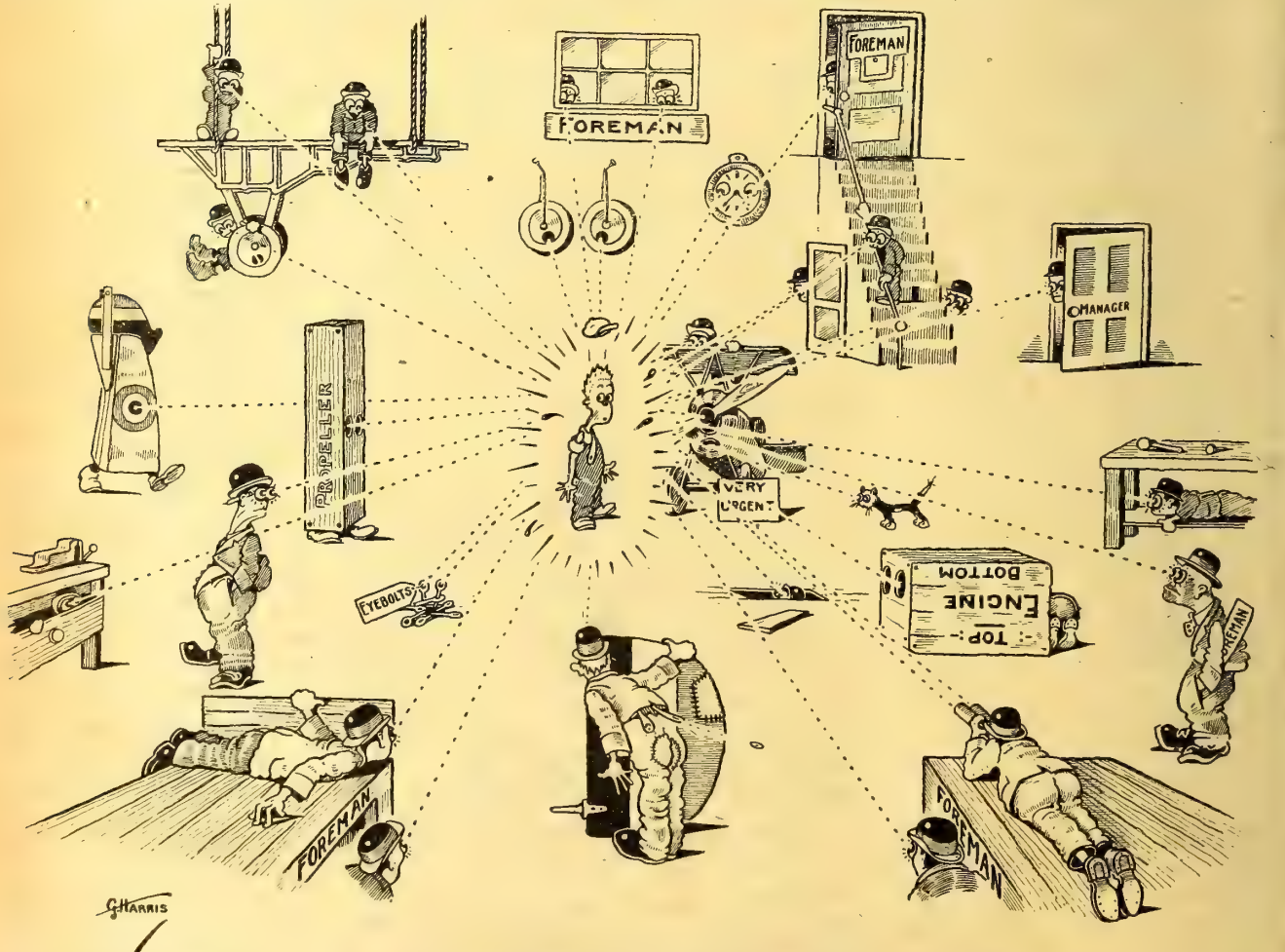
"Can we make them at the price?" I asked. Mr. Expert smiled, drawing from his breast pocket a strange article which I afterwards learnt was a calculating rule. He commenced to pull it about.

Really it was an extraordinary instrument. It told him how much mild steel it would require to make a part, and with the assistance of the market prices in THE AEROPLANE he arrived at the cost of the steel.

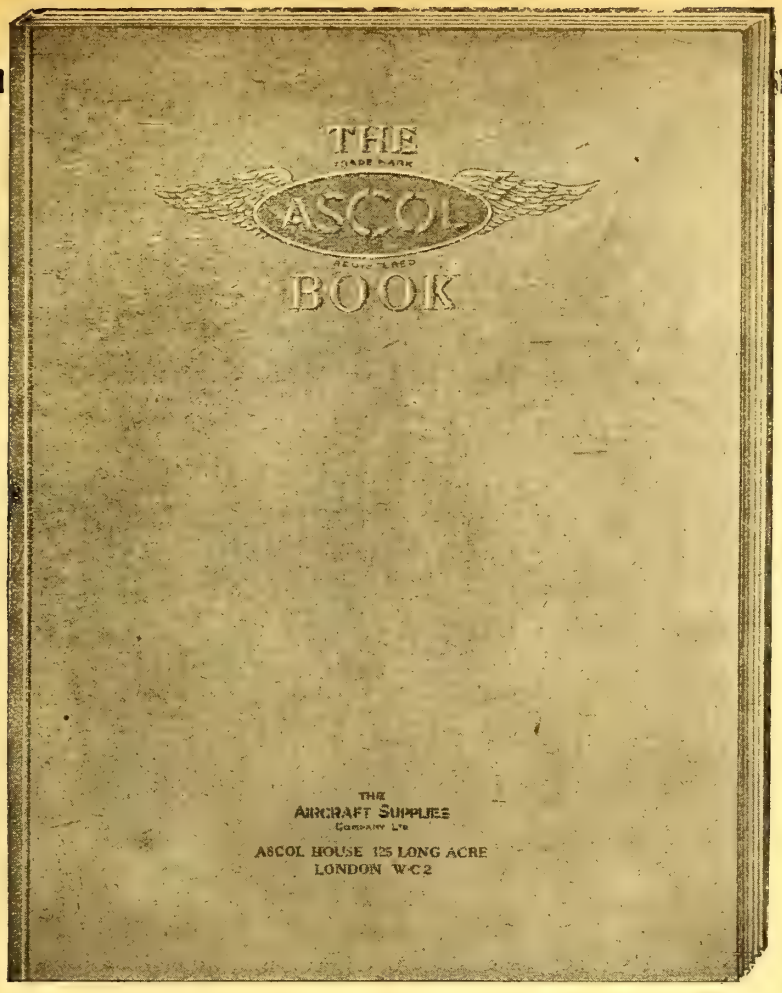
He knew all about labour and what it could do. Adding this to the price of the steel he arrived at the cost of the manufacture. The difference between this and the figure on the order was tremendous, so great that I could hardly believe it.

"Why there's a fortune here," I exclaimed. The expert smiled again—"Of course there is," he replied, "when we get properly started."

He knew—I did not—what "properly started" meant.



DISTORTED PERSPECTIVE. The workers' impression of the ubiquitous foreman. The utilisation of various handy objects for purposes of camouflage displays considerable ingenuity.



ORDER YOUR COPY OF THE ASCOL BOOK EARLY

YOU will find the Ascol Book full of just the information you want to know. Among other items it contains a reprint of the whole of the articles which have appeared in "Aircraft Supplies," details of A.G.S. Parts, sections dealing with "Ascol" Charts, a Beginner's Guide (which includes a great deal of information to those new to the industry), and a reprint of the "Glossary of Aeronautical Terms," from the "Aeroplane Speaks," by kind permission of the publishers, Messrs. McBride, Nast & Co.

The volume, which runs into close on 200 pages, will be sold for charity at 3s. 6d. per copy (postage 6d. extra). Special cloth-bound copies will be sold at 10s. 6d. each. Order your copy NOW.

THE AIRCRAFT SUPPLIES COMPANY LTD

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

ASCOL

"Now there are a few things we require," he continued, "the first is gas and electric light."

"Easy," I thought, and forthwith a personal application was made to the gas company, likewise the Borough Council for electric light.

At both places it was necessary to produce a permit from the Ministry of Munitions. We had not got this, but were informed where it could be obtained—The Priority Office, Caxton Street, W., or somewhere like that.

Off we rushed to the Priority Office, and interviewed a real, almost live, Cuthbert.

We could not get the permission right off, in fact we must write.

We did at once, and we considered that the permit would be in our hands by return of post—such is the simplicity of a dabbler.

While we were waiting for the permit, Mr. Expert arranged where the gas was to go, and soon had several men at work fixing the pipes for the supply that was to be "on" as soon as the permit arrived. The man who gives the permits for Aircraft Factories to use gas and electric light must have gone for a holiday or something. Anyway, nothing happened. A day passed, a week, two weeks, yet no permit; I was promised wondrous things when we got the gas, and I bowed my head in my home at night, many nights, and the prayer I said was, "God! Give the Cuthbert who giveth the permission for Aircraft Factories to have gas and electric light strength to write a permit for me."

Each morn I rose full of hope that "it" had arrived, and daily my hopes were shattered.

This nerve-racking business went on day after day.

"Gas, gas!" I prayed, "Oh for some gas; even poison gas!" Heavens! Could it be that the Cuthbert in the Priority Office had been gassed, or had he taken the "Evening News" to heart and joined up.

Oh, the terrible suspense, and incidentally the expense. The potential profits on the orders were disappearing. Rent, experts' salaries, and other little devils were gobbling up money in a merry way. All this till we "got started."

The Expert wanted other things besides light; he wanted two power drilling machines. These, I may explain, are not for soldiers; they are used for making holes in metal, etc.

We had what Mr. Expert described as an apology for a drilling machine, one that was worked by hand. We had a man turning this at 1/2 per hour, but he resigned saying we ought to hire Italians for turning the old organ; he wasn't going to pull his guts out for anyone.

After he went we got a young girl on the job. One morning's work, and her mother came to the factory "to see what we were going to do about it." "Right down wicked," she described it, "making young girls turn themselves into engines just because we were too mean to buy a power drilling machine."

But we were not; the truth was that we had tried to buy two of these necessary machines.

As in the light matter we wanted a permit. This had to be applied for from the Engineering Section No. X. Area, Hotel Magnificent Annexe, "application to be made on forms supplied in triplicate" (and damn the paper shortage).

Once more we waited the pleasure of a Cuthbert. This time there was no suspense. He sent round an inspector. I saw him, so did Mr. Expert.

He went into the question of why we required the machines; I explained there were twenty-five thousand holes to drill, and that if we continued the handle-turning process it would be a question not of using the engine parts in this war, but the next.

Well! we told him all about it. He inspected the factory, took all our names, and the details of the employees, their ages, etc. Now whatever all this had to do with making holes in steel I was at loss to understand, being a non-technical man. I supposed it must have something to do with the gauge of the metal or something.

Then a horrible thought flashed across my mind, D.O.R.A. can make a crime of anything; could it be that making aircraft was a crime?

The inspector looked at me in a mysterious way. I read his meaning to be, "I see a plan afoot to manufacture aircraft!" but I was wrong.

The poor man was ill, Mr. Expert told me so—"he suffers from dropsy."

"I am sorry for him," I exclaimed.

"You should have dropped to him," said Mr. Expert.

As I was not yet versed in all the technical terms, I did not understand, but I do now.

Anyway the No. X. Engineering Area did not think 25,000 holes any excuse for the purchase of drilling machines, so they refused the permit. And as the engine parts are of no use without the holes, I am afraid it will be a long time, if ever, before the parts in question will be fitted to Aircraft.

The same post that brought the refusal from No. X. brought a reply from the Priority Cuthbert. *We were not allowed to have the electric light or gas.*

Mr. Expert wants other things, such as a power press and a welding plant, but what's the use of these without light, and what's the use dabbling in aircraft manufacture? I'm cutting my loss, and going in for dabbling in perambulators when the troops come home.

DABBLER.

AN AMERICAN AERIAL MAIL.

Definite plans are being made by the United States postal authorities to try a serious experimental aerial mail, along routes of considerable length. Originally, private tenders were invited for the supply of the necessary aeroplanes, but all the offers have been rejected and it is proposed to use aeroplanes loaned by the War Department. Eight machines, of which two are intended as reserves, will be employed. It occurs to one that if it is desired to keep six machines regularly in use, the reserve of two is hardly adequate. Three to one would be nearer the mark.

One route is a 3-hour trip between New York and Washington. It will compare with the railway time of 5 hours 16 minutes. It occurs to one that such an itinerary will not give the aeroplane a chance to demonstrate its potentialities for coping with difficult circumstances.

Considerable discussion has been aroused regarding the selection of a suitable landing place at New York, but the waste of time which would be involved by the delivery of the mail in the suburbs will be overcome by dropping them into a net in the court-yard of the New York "up-town" post office.

The extension of the service to Atlanta is under consideration. Stopping places are contemplated at Philadelphia, Petersburg, Charlotte, Spartanburg, and Greenville, and the distance to be travelled under these conditions between New York and Atlanta will be 873 miles.

The organisers of experimental aerial mails of this character would do well to lay down routes for demonstration flights between places which are not served by through railway connections, because the average business man who has no sentiment at all for aeronautics will not be convinced that the increased cost and risk involved by sending mails by aeroplane is justified unless the saving in time is overwhelming. The proposed charge for an ordinary letter is 27 cents, or about 1s. 1½d., and in order to make the post popular at such a charge the deliveries have got to be hustled to a marked extent.

For distances of under 1,000 miles an aerial post does not begin to pay unless the alternative route involves transhipment from road to train, or from train to steamboat, when, of course, it is impossible to reduce the time taken by 75 and occasionally by 90 per cent. according to circumstances. But in the case of a route where the time taken is reduced from, say, 6 hours to 4 the ordinary business man would prefer to choose the slower and cheaper route especially if one aerial delivery in twenty failed, as might quite easily happen.

SCANDINAVIAN AIR TRAFFIC.

The "Morning Post" correspondent writes from Christiania on May 5th:—

Delegates representing aviation traffic companies in the three Scandinavian countries have been holding conferences here during the past two days with regard to the project for establishing an inter-Scandinavian commercial aviation service. To-day a public meeting was held, at which the King and a number of public men took part. An understanding has been arrived at, and the service is to be inaugurated in the near future. Companies are to be formed in the three countries, each of them being financed separately.

The Norwegian company has already begun to secure suitable sites for landing places. At the same time negotiations have been entered into with England with a view to securing permission for the dispatch of a sufficient number of aeroplanes to enable an import trade to be carried on with that country.

* * *

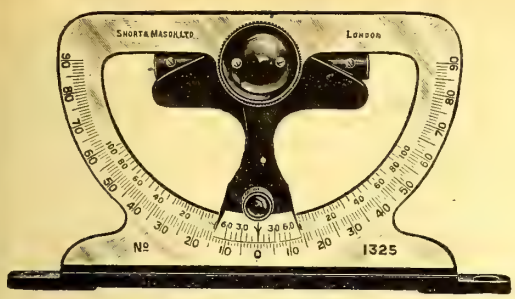
It is now reported that there is no intention to sanction an aerial postal service during the war between Stavanger and Aberdeen. The policy of the Air Board, and apparently now of the Air Ministry, has always been that if aeroplanes are suitable for such services they can be far better employed in war operations. Similar representations from France have also been temporarily declined for the same reason.

[At the same time there are actually quite a number of machines and pilots which could be employed on such work without depleting active service material or personnel.—Ed.]

* * *

A message from New York, dated May 15th, says:— A regular aerial post was inaugurated in the United States to-day between New York and Washington, and before long it is expected that the service will extend all over the country. Machines of the Curtiss type, equipped with a 150 horse-power Hispania-Suiza motor, and capable of carrying from 300lb. to 600lb., left New York and Washington simultaneously, the latter carrying a specially autographed letter by President Wilson appealing for Red Cross funds.

One got through and the other failed soon after the start.



(HALF ACTUAL SIZE.)



(HALF ACTUAL SIZE.)

"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES
TO CLOSE LIMITS DURING

ASSEMBLING AND CONSTRUCTION.

HEIGHT MEASURING

ANEROID ALTIMETERS

FOR EVERY TYPE OF

AIRCRAFT

MANUFACTURED BY

SHORT & MASON, Ltd.,

WALTHAMSTOW, LONDON, E.17.

Telegrams: "Aneroid, Phone, London."
Telephone: Walthamstow 180.

GWYNNES

LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE.

"CLERGET" PATENT AERO ENGINES.

S.B.A.C. — The Society of British Aircraft Constructors Limited

ENGINEERS, LONDON.

"GWYNNE, LONDON."

CANNONS' (LINCOLN) AEROPLANE GLUES

"IL PROPELLER" (Cake Glue)
FOR PROPELLERS.

"AERIAL" (Cake Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

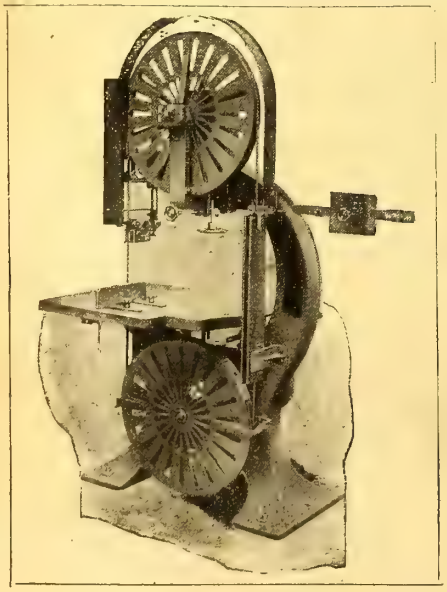
"XL" MIXTURE (Jelly Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

"BI" (Cake Glue)
FOR CLASS 2 WORK.

SOLE MANUFACTURERS:

B. CANNON & CO., LTD., LINCOLN.

HAIGHS
(OLDHAM) LIMITED
MANUFACTURERS OF ALL TYPES OF WOODWORKING MACHINERY.



C.K.S. Type High Speed
Band Sawing Machine

BUILT IN THREE SIZES
WITH SAW PULLEYS.

26 inches, 30 inches, and 36 inches diameter.

OLDHAM.

Telegrams: HAIGH, OLDHAM.
Telephone: 1273 Oldham.

Haighs (OLDHAM) LTD.

AIRCRAFT FINANCE

CURRENT TOPICS.

AWAITING THE HUN.

No developments of special significance or importance have occurred to influence the financial world. The Budget no longer excites the slightest interest. The halt on the Western battle front is becoming tedious and not only inspires caution with the resultant check to any latent initiative in the Stock Exchange, but it prevents the materialisation of any embryonic financial schemes outside.

It is not that there is a lack of confidence. On the contrary, no one was more sanguine of the ultimate issue, but at the same time no one doubts that the German offensive will soon be resumed. That creates uncertainty, and uncertainty is frequently a greater anathema to the financial world than bad news.

Speculative Interest.

Aircraft construction and kindred shares have claimed as much interest as the average industrial security; indeed transactions in them have been rather more frequent because there happen to be quite a number of people who want something with speculative possibilities. Admittedly these are almost as difficult to find as a needle in a haystack, but nevertheless the chance of obtaining an appreciation in capital value and thereby dodging income tax seem irresistible to some.

Blériot's Bigger Dividend.

The French Blériot Co. has decided to pay a dividend of 20 francs per share. This is instructive as well as interesting. For 1916 the dividend was only 12½ francs, and the year's net profits figure at 890,956 francs in comparison with 523,840 francs for 1915. With the balance brought into the accounts there is a disposable surplus of 1,021,460 francs. The dividend does not involve as much as 400,000 francs.

More Capital Needed

In view of the growth of the business and with a view to preparing for the changed conditions after the war it is considered desirable to provide more working capital. Therefore the shareholders have authorised the board to create 2,000 ten year bonds of 500 francs each. These will bear 6 per cent. interest, and are to be offered at the price of 490 francs.

Aero Engine Profits.

The construction of motor and aeroplane engines, more particularly the latter, is now the chief concern of the Ballot Co., a French undertaking. Last year's report recently made its appearance. The profit earned was 2,519,232 francs against 2,021,954 francs for 1916.

The profits, it is emphasised, are struck after making ample provision for all contingencies, and also that the capital of the concern is only 1,800,000 francs in 100 franc shares. These are now priced on the Bourse at about 400 francs, having responded to the dividend of 25 francs per share, which calls for 450,000 francs.

A Pleasant Bonus.

Reverting to the British industry, the Electric Construction Co. has now provided a pleasant surprise for its shareholders. In addition to the dividend of 7½ per cent. there is to be a bonus of 2½ per cent., making 10 per cent. in all for the year. For the two preceding financial years the payment was 7½ per cent., and for the year previously 6 per cent. It had been expected that the past year's results would show up well, and there are some people who expected a rather higher distribution than that announced. However, at 25s. the Ordinary shares represent a yield of 8 per cent., which is really not so bad.

Petrol Prospects.

If coal is the King of Industry, petrol is certainly the Crown Prince. It is the recognition of the potentiality of oil and its wonderful product, petrol, that explains the constantly increasing interest in oil shares. Without a doubt they are the most consistently bright market in the whole of the Stock Exchange, having ousted rubber shares.

With the Russian oilfields suffering from the effect of severe physical damage, and the Roumanian oilfields also hors de combat and the petrol shortage increasing, oil is, in the market sense, likely to be dearer before it becomes cheaper. At the same time, many of the shares are commanding a price which discounts a lot of possibilities.

STRAKER-SQUIRE, LTD.

The shareholders' meeting of Straker-Squire, Ltd., was held last Thursday, Mr. Sidney Straker, A.M.I.C.E., Chairman and Managing Director, presiding.

The Chairman, in moving the adoption of the report and accounts, said that the period under review—namely, Oct. 4th, 1915, to Dec. 31st, 1917—had not been free from anxiety, but, on the whole, the results might be considered as satisfactory. He had been of the opinion for some time that to present accounts showing profits subject to excess profits duty was not only unsatisfactory, but often misleading, and accordingly the profit of £28,685 was net profit, after meeting all claims for excess profits. Of this sum the shareholders had already received dividends amounting to £21,119, and it was now proposed to pay a balance dividend at the rate of 10 per cent. per annum for the year ended Dec. 31st, 1917, amounting to £8,750, which would leave a carry-forward of £3,880. Considering that they had met all claims for excess profits and had not yet been able to take full advantage of the additional capital subscribed last year, the result was one which should afford gratification to all concerned.

In September, 1916, an arrangement was made with the Government by which the company's factory was taken over at a rental of £27,500 per annum, and, in addition, they were to have a sum for compensation for disturbance, payable when the factory was handed over to the company again. At the moment it was difficult to prophesy what condition the works might be in at the uncertain date when they would be in possession again, or whether the sum to be paid for compensation would be adequate to meet the circumstances. He entertained the belief, however, that they would probably receive fair treatment, and if they did he hoped that the period which must elapse between the time of their resuming possession and getting these works, with supplementary works, into full working order, would be such that the company's future prospects ought not to be jeopardised. In the meantime a considerable part of the new capital had been expended in laying down further machinery at their other works, and generally extending the manufacturing facilities of the company. Those works were fully employed, and the trading profit was quite satisfactory.

Looking Ahead.

Besides other Government work, they were engaged upon manufacturing spare parts for vehicles which they had manufactured in the past. The board was carefully considering the best means of meeting future competition and placing the company in a position to manufacture at the earliest possible opportunity. Their latest commercial model had proved such an attractive machine that orders had been placed by many of the most important agents in the kingdom, and deposits paid on orders on hand, which orders amounted to approximately £150,000. Until they were further forward in their arrangements for manufacture they did not consider it advisable to accept further orders.

COMMERCIAL AERONAUTICS IN SIAM.

The first annual general meeting of the shareholders in the firm of Barrow, Brown & Co., Ltd., the well-known firm of merchants, who have supplied aircraft matériel in the past to the Siamese Flying Services, took place at the Company's office in Bangkok on March 9th, Mr. W. A. Graham being in the chair.

The Directors' report and balance sheet were adopted, and a dividend declared of 10 per cent. for 1917. The report showed that in addition the position of the Company has been strengthened by ample reserves.

Mr. Brighouse was re-elected a Director, and Mr. Leatherbarrow was also voted a member of the Board. Mr. Donaldson was re-appointed auditor.

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

The files of the following new companies are available for inspection at Somerset House.

Aeronautical Consultants, Ltd.—Private company Registered May 10th. Capital, £1,000 in £1 shares. To enter into an agreement with E. St. Clair Duncan and A. J. Swinton and to carry on the business of manufacturers of and dealers in mechanical, electrical and general engineering appliances, motor

boats, seaplanes, floats and accessories, aviation and aeronautical instructors, etc. The subscribers (each with one share) are:—T. Charlton, 21, Pendarves Road, S.W.19, financial agent; S. Whorlow, 67, Mount Pleasant Road, Lewisham, S.E., financial correspondent.

The Jackson Aircraft Co., Ltd.—The Directors have declared an interim dividend at the rate of 7½ per cent. per annum, free of income tax on the preference shares.

Mr. J. L. Curtiss has been appointed Secretary in the place of Mr. Herbert Bennett who has resigned. The registered offices of the company are at 215, Mare Street, Hackney, E.8.

L. R. Syndicate, Ltd.—Private company. Registered May 15th. Capital, £1,000 in 1s. shares. To work a process for rendering incombustible and/or impermeable wood, paper, cloth and other materials, to manufacture a substitute for doping and soap or a substitute for soap, to manufacture sealing wax and apparatus for preventing the explosion and combustion of the petrol oozing from aeroplane and other tanks, etc. To enter into an agreement with F. J. Lecharlier and A. A. J. Ravelli. The subscribers (each with one share) are:—F. J. Lecharlier, 90, Cannon Street, E.C., engineer; A. A. J. Ravelli, 70, Princes Gate, S.W., notary; W. C. L. Lamot, 22, Northumberland Avenue, W.C., agent. Permanent directors: F. J. Lecharlier and A. A. J. Ravelli.

M. L. Glover & Co., Ltd.—Private company. Registered May 15th. Capital, £4,000 in £1 shares. To take over the business of manufacturers of heat-treated and otherwise finished aeroplane engine and other parts carried on by M. L. Glover at 39, High Street, Cheadle, Ches. The subscribers are:—M. L. Glover, 1, Priestman Road, Heaton Mersey, engineer, 1 share; A. A. Smith, Riversdale, Romiley, near Stockport, solicitor, 10 shares. The first directors are:—M. L. Glover and A. A. Smith. Solicitors:—Hervey Smith and Sons, 93, Market Street, Hyde.

Sadgrove Aircraft Co., Ltd.—Private company. Registered May 15th. Capital, £15,000 in £1 shares. Aircraft constructors, engine, motor and turbine manufacturers, etc. The subscribers (each with one share) are:—W. B. Sadgrove, The Knowle, Normanton Road, South Croydon, wholesale furniture manufacturer.; W. H. Sadgrove, Walden, Woodcote Valley Road, Purley, aeroplane manufacturer. The first directors are:—W. H. Sadgrove (permanent), W. E. Brown, and J. S. Richardson. Solicitors:—Ward, Bowie & Co., 7, King Street, E.C.

Alloy Welding Processes.—Registered May 9th. Manufacturers of and merchants of electrodes for electric blow-pipe and other forms of welding and soldering, etc., etc. Nominal capital, £120,000 in 20,000 £1 preference shares and 100,000 £1 ordinary shares. Directors: E. H. Jones, 18/20, Church Square, Islington, engineer. Qualification of director 100 shares.

ANSWERS TO CORRESPONDENTS.

"Elixir."—If the trust deed comprises both partly capital to replace existing debentures and partly new capital it will require to be stamped at the rate of 2s. 6d. per hundred pounds in respect of the whole amount as a new security and not in part as a substituted security as you appear to surmise. The case has been fought and records stand. If you desire the reference is at your disposal.

"Evergreen."—Your enquiry is quite outside my scope. Refer to any of the standard works on political economy.

"M.A.C."—The concern is a private company. The accounts are consequently not published, but as a shareholder you have a right to be furnished with the auditors' certified copy and also a copy of the memorandum and articles of association. There is no market quotation for the shares and no information is available to enable a valuation to be furnished, but if you will send along a copy of the last balance sheet I will gladly give you an opinion.

A RESIGNATION.

It is announced that Mr. A. H. Botwright has resigned his Chairmanship and Directorship of the London Aviation Co., Ltd., 29, Charlotte Street, Shoreditch, and has no longer any connection whatever with that firm.

AMERICA'S PROGRESS.

Mr. J. W. H. Mason, writing from New York to the "Daily Express" on May 10th says:—

America's production of aeroplanes is now entering the stage where rapid output has been made possible by the co-ordinated work of thousands of Government employees in numerous industries, from lumber felling to cloth weaving.

When America entered the war, the Government had a total of 260 aeroplanes, mostly of inferior types.

[One doubts whether there were half as many which were fit to fly. At any rate there were never a dozen at a time in flying order during the Mexican campaign.—Ed.]

The personnel of the aviation corps, which was a brench of the War Department's Signal Corps, was only a few hundreds strong. The total available aeroplane productivity of the country during the twelve months preceding America's declaration of war was sixty-four machines. The Government had ordered a total of 366 for the year, but sixty-four was the best that could be done by the eleven plants (only one of them of any magnitude) then engaged in airship building. Between April 1st, 1916, and April 1st, 1917, American aviators were in the air for an aggregate of only 1,000 hours. There were but three aviation grounds for the army's flying men between the Atlantic and the Pacific.

From this condition to that existing at present represents the work almost of a magician. To-day there are a score of aviation fields in the United States. At one of these camps, a few days ago, there were 135 machines in flight. The total hours spent in the air by the birdmen during that one day was 857—nearly as many as all American military aviators had spent aloft for the entire year previous to America's entrance into the war. The distance covered by the airmen at that one camp on that one day was 50,000 miles—twice around the world.

[857 hours for 135 machines means almost 6½ hours by each machine in the day, so one takes leave to doubt the figures. But 50,000 miles in 857 hours is only 58 miles an hour, so it does not seem that the machines can be of high value even as training machines. Figures are dangerous things to use without knowledge of their significance.—Ed.]

There are now over forty plants in America making aeroplanes. Over 400 factories are turning out special parts for aeroplanes and fifteen engineering companies are engaged in building the motors.

Aviators are now numbered in the thousands, and the graduates from American flying schools are more numerous than the total aviators engaged in action in any one day on either side of the western front.

TO ALL INTERESTED IN AEROPLANE COMPANIES.

A publication which should be of considerable value to all those concerned with the business side of aviation has just been published by the Aeroplane and General Publishing Co., Ltd., entitled "The Aeroplane Blue Book," a Directory of Aircraft Finance.

This handbook sets forth financial particulars concerning the leading firms engaged on aircraft construction, and on allied work, and indicates the capital of each company and how divided, the amounts issued and paid up, names of directors and other official profits and dividends declared, loans, mortgages and other charges, extracts from last balance sheets and directors' reports.

The information contained in the Blue Book is essentially public in character and each entry is of a nature which could be obtained from the files at Somerset House, but it will be manifest that its collation in a handbook will save endless time to those interested in the financial state of the different companies, and actually a real economy is affected in its purchase, because each inquiry at Somerset House involves a fee of 1s., whereas the price of the Aeroplane Blue Book post free is 1s. 7d.

As a book of reference it should be filed by every manufacturer interested in the industry and should be examined by every shareholder.

CURRENT SHARE QUOTATIONS.

May 21st, 1918.

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	22/6	23/6
	7% cum. & ptg. "B" pref., (fully paid) £...	22/-	23/-
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref. £5...	3 7/16	3 9/16
	5% 2nd. pref. £1 ...	15/6	16/9
	£1 ordinary	40/9	41/9
Austin Motor Co., Ltd.	7% cum. pref. £1...	17/6	18/6
	£1 ordinary	26/-	27/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	63/-	64/-
	5% cum. "A" pref.	4	4½
	6% cum. "B" pref.	20/-	21/-
Boulton & Paul, Ltd., 5% cum. pref. £1		¾	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4	4½
Darracq (A) & Co., (1905) Ltd.	£1 ordinary ...	1⅝	1¾
	7% cum. pref. £1...	22/-	23/-
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	19 6	20/6
	£1 ordinary	24/-	25/6
Fellows Magneto Co., 8% cum. partip. pref.		17/-	18/-
General Electric Co., Ltd.	6% cum. pref. £10 ...	10	10½
	£10 ordinary	19¾	20¾
Gwynnes, Ltd., 5% cum. pref.		5⅛	5⅜
	Ordinary	36/-	38/-
Greenwood & Batley, Ltd., £10 ordinary		13½	14½
Humber, Ltd., 6% cum. pref. £1		15/-	16/-
	£1 ordinary	20/9	21/9
Napier (D) & Son, Ltd., 7½% cum. pf. £1		19/3	20/3
	£1 ordinary	32/3	33/3
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		18/6	19/6
Rolls Royce, Ltd., £1 ordinary		39/6	40/6
Rudge Whitworth, Ltd. £1 ordinary ...		44/-	46/-
Ruston, Proctor & Co., Ltd.	£1 ordinary	29/6	30/6
	5% cum. pref. £1 ...	17/-	18/-
Sunbeam Motor Car Co., Ltd., £1 ord...		3⅜	4
Straker Squire, Ltd. (1913), £1 ordinary		22/-	23/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26 6	27/6
Triplex Safety Glass, £1 ordinary... ...		26/6	27 6
Vickers, Ltd., 5% pref. stock...		£0	84
	5% pref. shares. £1 ...	16/6	17/6
	£1 ordinary	41/6	42 x
Wm. Beardmore & Co., Ltd., 6% c. pf. £1		18/-	18 6x

GENERAL INFORMATION.

Armstrong, Whitworth (1916)
Austin Motor (1916)
Rolls Royce (1916 & 1917)
Rudge Whitworth (1916 & 1917
Smith (S.) & Sons (1917)
Straker-Squire (1916)
Sunbeam Motor
Thorneycroft (J. I.) & Co.
Vickers (1916 & 1917)

Owing to the difficulty of estimating liabilities under Finance and Munitions Acts, the accounts will not be ready until a later date.

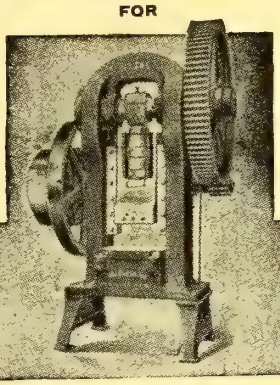
x—ex dividend

BLISS

PRESSES & DIES
FOR

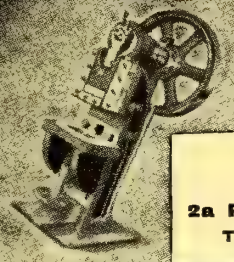
AEROPLANE

SEND YOUR STAMPING PROPOSITIONS TO US.



STAMPINGS

WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.



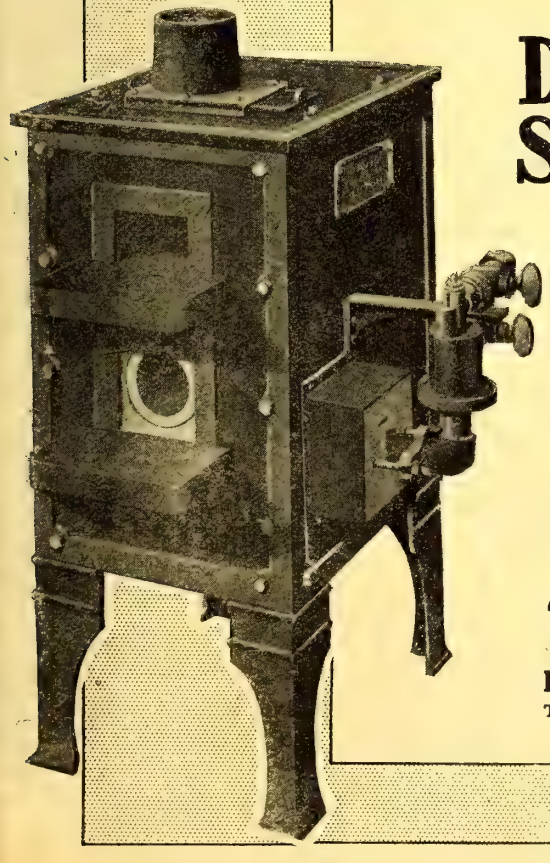


WRITE TO

E. W. BLISS CO.,

2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1

TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."



Davis High-Speed Steel Furnaces

The Davis "D.H.S.T." series of Gas-fired Furnaces have been specially designed for the hardening of modern High-Speed Steel Tools, and to provide the maximum of convenience and efficiency at the least practicable fuel cost.

The firing element consists of Davis PATENT Air-Blast Burners, for gas at ordinary main pressure and air at 2 lbs. per sq. inch. Two chambers are provided, each fitted with stopper brick, a pre-heating temperature of 1,000 deg. C. being attainable in the upper chamber, and 1,350 deg. C. in the lower; whilst the flame does not impinge on the work.

Illustration shows the No. 50 size (top chamber 10 in. by 4 in. by 2 in.; lower chamber with silica tube, 9 in. by 2¼ in. inside diameter). Price **£16 6s. 6d.** complete. Write for Lists F18 A, B and C (gratis).

Also Ovens, Muffles, Crucibles, Lead Melters, etc.

THE DAVIS FURNACE COMPANY

(PROPRIETORS: THE DAVIS GAS STOVE CO., LTD.)

Dept. Q, The Diamond Foundry, Luton, Beds

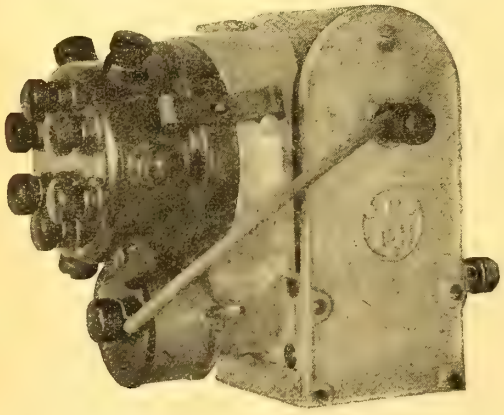
Telegrams: "Castings, Luton." Telephone: Luton 260

MAGNETOS

are All-British in design and manufacture, and used wherever absolute reliability in service is essential.

The
British Thomson-Houston Co., Ltd.
Electrical Engineers and Manufacturers,
Lower Ford Street, Coventry, England.

Member of the British Ignition Apparatus Association,

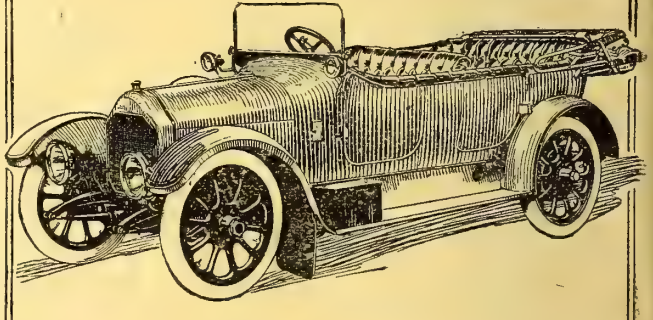


B.T.H. Magneto for 12-Cylinder Engine.

Although it is not possible to buy a———

Humber

———Car so long as the Government commands the productions of the Humber Company, you will lose nothing by waiting for our after-war models which will be vastly improved by the experience gained in the manufacture of the most perfect engines used in the Air Services.



Orders executed in rotation.

HUMBER LIMITED,
COVENTRY.

(*Continued from page* 1882.)

pletely out of control five hostile machines and sent down one other crashing to earth. He has displayed the greatest gallantry, courage, and determination in dealing with enemy aircraft.

Lt. (Temp. Capt.) R. Dodds, Cent. Ont. R. and R.F.C.

He has destroyed or driven down 11 enemy machines. On one occasion while on a one-machine patrol he attacked three enemy scouts, but owing to his gun jamming he was forced to withdraw from the attack. Though under heavy fire from the pursuing enemy he succeeded in remedying the defect, and then turned and attacked the enemy again. He destroyed one of them and drove down another out of control. Later, he led a bombing raid on an enemy aerodrome, and under intense machine-gun fire from the ground dived to within 100ft. of the hangars before releasing his bombs. Though his machine was damaged he remained at a height of 200ft. until the rest of his formation had dropped their bombs. His magnificent example of pluck and determination was of the greatest value to the squadron.

Lt. A. B. Fairclough, Can. M.G. Co. and R.F.C.

During four months he has destroyed four enemy machines, and has driven down two others completely out of control. When engaged with hostile aircraft he has at all times displayed the utmost dash and courage.

Lt. K. W. Junor, Can. M.G. Corps and R.F.C.

In aerial fighting he destroyed two enemy machines and drove down two others out of control, which crashed on landing. He always showed the greatest courage, skill, and resource.

Lt. R. W. McKenzie, Aust. F.C., attd. R.F.C.

As a result of engaging hostile aircraft during four months, he on four occasions has destroyed a total of four hostile machines. He has also carried out numerous low-flying reconnaissances, in which he has bombed and engaged with machine-gun fire enemy formations. He has at all times displayed marked determination and devotion to duty.

War Office, May 14th.

REGULAR FORCES.—Establishments—R.F.C.—Mil. Wing.—Flt. Comdr.—Lt. E. D. Dent, Durh. L.I., T.F., from a Flying Officer, and to be temp. Capt. whilst so empld., Dec. 18th, 1917.

Memorandum.—Maj. R. Cockburn, Suff. R., to be temp. Lt.-Col. while Comdt., Officers' Technical Training Corps, R.F.C., vice temp. Lt.-Col. F. A. Forde, Gen. List, March 15th.

Air Ministry, May 14th.

R.A.F.—The following appt. is made at the Air Ministry:—Staff Officer, 2nd Cl.—Lt. (Hon. Capt.) L. G. S. Reynolds, and to be temp. Maj. while so empld., April 3rd. (Substituted for notification in "Gazette" of May 3rd.)

The following temporary appts. are made:—Staff Officer, 1st Cl.—Maj. J. H. Lidderdale, and to be temp. Lt.-Col. while so empld, April 6th; Maj. (temp. Lt.-Col.) P. C. Maltby, D.S.O., and to retain his temp. rank while so empld., May 1st.

Staff Officer, 2nd Cl.—Maj. A. R. C. Cooper, May 4th.

Staff Officer, 3rd Cl.—And to be temp. Capts. while so empld.:—D. L. Blumenfeld (Lt., Essex R., Spec. Res.), and is granted a temp. commn. as Lt. (substituted for the notification concerning this Officer in the "Gazette" of May 3rd), April 1st; Lt. J. M. Watson, April 23rd; Lt. R. MacFarlane, May 1st.

Staff Officer, 4th Cl.—Lt. J. S. Goggin, April 22nd.

Flying Branch.—Maj. (temp. Lt.-Col.) A. C. Barnby to be temp. Lt.-Col. while empld. as Lt.-Col. (Flying), May 6th.

Lts. to be temp. Capts. while empld. as Capts. (Flying):—T. C. Lowe, April 22nd; J. E. Pugh, April 23rd; J. W. Matthews, F. Williams, May 2nd; J. W. D. Leigh, M.C., May 4th; (Hon. Capt. L.) G. S. Reynolds, May 9th.

E. R. Clayton is granted a temp commn. as Sec. Lt., April 11th.

Lt. (Lt., 5th Bn., N. Lan. R., T.F.) C. W. Pengelly relinquishes his commn. on ceasing to be empld. on acct. of ill-health contracted on active service, May 15th.

Sec. Lt. Y. A. McLean relinquishes his commn. on acct. of ill-health contracted on active service, and is granted the hon. rank of Sec. Lt., May 15th.

Technical Branch.—A. F. Bruce is granted a temp. commn. as Capt., May 6th.

Lt. L. Stones relinquishes his commn. on acct. of ill-health, and is granted the hon. rank of Lt., May 15th.

Administrative Branch.—The following are granted temp. commns. as Lts.:—A. L. Grant, April 1st; J. A. Mackie, April 16th.

The following are granted temp. commns. as Sec. Lts.:—H. S. Adams, April 14th; H. V. Bullock, April 29th; B. F. Browne, J. R. Johnson, R. F. Pyke, H. R. Oldfield, May 1st; T. Bathurst, F. T. Beer, T. D. Bell, E. A. Berry, H. S. M. Coster, A. T. Davis, G. H. Davis, F. Drake, P. F. Elliston, E. C. Farman, E. Fort de Burgh Greenwood, J. Hartley, E. B. Haynes, C. H. Hare, H. A. Hobbs, P. C. Jones, H. T. March, W. J. H. Morgan, L. P. St. V. Nepean, J. Nelson, H. F. Phillips, H. G. C. Plumridge, W. S. Race, W. Ranger, J. Sidebotham, H. Sleigh, N. S. Stevenson-Moore, W. A. Smith, May 3rd; S. Bishop, F. T. Dixon, P. H. F. George, W. A. R. Heaven, A. V. Jay, J. L. Malkin, L. E. Pool, T. Williams, May 6th; B. F. T. Hare, May 8th; G. H. Mewes, May 14th.

Medical Branch.—The following are granted temp. commns. as Capts.:—H. R. Carter, April 23rd; S. J. A. Beale, H. Stedman, May 1st.

The following is granted a temp. commn. as Lt.:—D. Pennington, April 20th.

War Office, May 16th.

REGULAR FORCES—Establistments—R.F.C.—Mil. Wing.—Special Appt.—(Graded as a Park Comdr.).—Bt. Maj. I. A. S. Cooke, Conn. Rang, Spec. Res., March 23rd.

Gen. List.—Flt. Serjt. F. V. Webb, from R.F.C., to be temp. Sec. Lt., Jan. 28th.

Admiralty, May 17th.

The King has been pleased to approve of the award of the following honour for services in action with enemy submarines:—

Distinguished Service Order.

Flt. Comdr. R. Leckie, D.S.C., R.N.A.S.

* * *

The King has been pleased to approve of the award of the following decorations and medals to officers and men of the Royal Naval Air Service:—

(i.) *For Services in Mesopotamia.*

The Distinguished Service Cross.

Lt. G. D. Nelson, R.N.V.R.

For the great courage and devotion to duty displayed by him as engineer officer of his detachment. He was untiring in his work, in spite of attacks of malaria and dysentery, and the successful running of the engines was due to him.

Flt. Sub-Lt. J. D. Hume, R.N.A.S. (since killed):—

For continuous good patrol work, artillery spotting, feeding Kut-el-Amara, etc., sometimes making three trips a day under all weather conditions. He invariably displayed great coolness and resource in the face of the enemy, regardless of personal danger.

A Bar to the Distinguished Service Cross.

Flt. Lt. V. G. Blackburn, D.S.C., R.N.A.S.

For services in the advance and retreat from Ctesiphon, when he performed most excellent work.

Flt. Sub-Lt. W. H. Dunn, D.S.C., R.N.A.S.

For conspicuous courage and skill in carrying out an extraordinary amount of flying, both in sea and land planes. He is invariably cheerful and ready when called on for work.

The Distinguished Service Medal.

C.P.O. Mech., 1st Gr., J. F. Armitt, O.N. 343587 (Ch.); C.P.O. Mech., 2nd Gr., J. Rodger, O.N.M. 2435 (Ch.).

* * *

The following officers have been mentioned in dispatches:—Wing Comdr. F. W. Bowhill, R.N.A.S., Flt. Lt. C. B. Gasson, R.N.A.S., Obsr. Lt. E. F. Turner, R.N.A.S.

(ii.) *Miscellaneous.*

A Bar to the Distinguished Service Cross.

Flt. Comdr. C. P. O. Bartlett, D.S.C., R.N.A.S.

For conspicuous bravery and devotion to duty in carrying out bombing raids and in attacking enemy aircraft. On March 28th, 1918, he carried out three bombing raids. Whilst returning from one of these missions he was attacked at a height of about 2,500 feet by three enemy triplanes, and five other scouts. One of these he drove down, attacking it with his front guns, whilst his observer shot down out of control a second. Observing that two of the triplanes were diving on him and converging, he side-slipped his machine away with the result that the two enemy machines collided and fell to the ground together, where they burst into flames. He has carried out very many bombing raids, and brought down several enemy machines, invariably showing the greatest skill and determination.

Flt. Lt. (Actg. Flt. Comdr.) L. H. Slatter, D.S.C., R.N.A.S.

For distinguished service rendered during a bombing attack on Ostende Seaplane Station on March 26th, 1918, when, in spite of intense anti-aircraft fire and the glare of numerous searchlights, he descended to 400 feet over his objective to drop bombs. Flt. Comdr. Slatter is a leader of unqualified keenness and dash and possessed of exceptional courage and judgment.

* * *

The following decoration and medal have been awarded by an Allied Power. The King has in each case given unrestricted permission for their use on all occasions.

Conferred by the President of the French Republic.

Croix de Guerre.

Sqdn.-Comdr. H. R. Busteed, O.B.E., R.N.A.S.

Medaille Militaire.

C.P.O. Mech., 1st Gr., A. H. Simmonds, O.N. M.443.

Correction.—In "Gazette" dated May 1st, page 5,281, col. 2, for Flt. Lt. Frederick Neville Halstead, R.N.A.S., read Flt. Lt. Francis Neville Halsted, R.N.A.S.

War Office, May 17th.

REGULAR FORCES.—Staff.—A.Gs. and Q.M.Gs. Staff.—A.A. and Q.M.G.—Capt. (temp. Lt.-Col.) C. Fraser, M.C., N. Staff R., from a Staff Officer, 1st Cl. R.F.C., graded as an A.A.G., and to retain his temp. rank whilst so empld., Jan. 28th.

D.A.A.Gs.—Temp. Maj. W. D. Long, Gen. List, from a Sqdn. Comdr., R.F.C., Jan. 28th. Capt. C. M. Phillips, Suff. R., T.F., vice Capt. N. Rooke, High. L.I., Feb. 23rd.

Special Appts.—(Graded for purposes of pay as Staff Capts. whilst employed as Sqdn. Comdrs. of Cadet Wing, R.F.C.):—Capt. P. J. Whitty, R. Ir. Regt., Oct. 31st, 1917, Capt. W. L. Blake, Norf. R., T.F., and to be secd., Nov. 16th, 1917.

Attd. to Hdqr. Units.—Brig. Comdrs.—And to be temp. Brig.-Gens. whilst so empld.:—Capt. (temp. Col.) A. E. Borton, D.S.O., R. Highrs., from graded as a Group Comdr.; Bt. Maj. (temp. Col.) P. L. W. Herbert, Notts. and Derby R., from a Group Comdr., Jan. 28th.

Staff Capts.—Capt. R. B. C. M. T. de Poix, Norf. R., T.F., from a Staff Officer, 3rd Cl., R.F.C.; Lt. K. A. C. Creswell, R.F.C., Spec. Res., from an Equipt. Officer, 3rd Cl., R.F.C., and to be temp. Capt. whilst so empld.; Capt. G. Disney, Essex R., from Staff Officer, 3rd Cl., R.F.C., Jan. 28th.

Establishments.—R.F.C.—Mil. Wing.—Flt. Comdr.—Lt. A. G. Pearce, Cent. Ontario R., Canadian Exped. Force, from a Flying Officer, and to be temp. Capt. whilst so empld., March 1st.

Asst. Instrs. in Gunnery.—(Graded as Equipt. Officers, 3rd Cl.)—From Flying Officers (Obsrs.):—Lt. D. McK. Finlayson, Cam'n Highrs., T.F., Feb. 18th. Capt. R. H. Brewis, Lanc. Fus., T.F., Feb. 19th.

Equipt. Officers, 1st Cl.—The notification regarding the undermentioned Officers should read "from the 2nd Cl.," and not as in the "Gazette" of April 27th:—Temp. Lt. A. L. Wilson, Gen. List; Lt. S. Ransom, Spec. Res.; temp. Lt. M. L. Horn, Gen. List.

Schools of Instrn.—Schools of Mil. Aeronautics.—Instr.—(Graded as an Equipt. Officer, 1st Cl.)—Lt. (temp. Capt.) R. O. C. Bush, R. Dub. Fus., an Equipt. Officer, 3rd Cl., relinquishes his appt. and temp. rank on vacating his appt., March 23rd.

Memorandum.—Bt. Lt.-Col. (temp. Brig.-Gen.) W. G. H. Salmond, D.S.O., R.A., to be temp. Maj.-Gen., Jan. 28th.

Air Ministry, May 17th.

R.A.F.—The follg. temp. appts. are made at the Air Ministry:

Dep. Director.—Maj. F. J. Scott, and to be temp. Col. while so empld., May 1st.

Staff Officer, 3rd Cl.—Capt. D. J. Smith, May 1st.

Staff Officer, 4th Cl.—And to be temp. Lts. while so empld.:—Sec. Lt. D. B. Gunn, Sec. Lt. W. R. Simpson, Sec. Lt. F. C. Wild, May 1st.

The follg. temp. appts. are made:—Maj.-Gen. Sir H. M. Trenchard, K.C.B., to be specially empld., May 8th.

Staff Officer, 1st Cl.—F. R. Drake (Bt. Lt.-Col. in Army), (Res. of Officers), and is granted a temp. commn. as Lt.-Col., May 3rd.

Flying Branch.—Capt. (temp. Maj.) C. H. Blount, M.C., to be temp. Lt.-Col. while empld. as Lt.-Col. (Flying), seny. April 17th, May 4th.

Lts. to be temp. Capts. while empld. as Capts. (Flying).—A. G. Goulding, M.C., April 26th. (Hon. Capt.) W. O. Redgate, April 30th. E. W. C. G. de V. Glentworth, May 6th.

The following are granted temp. commns. as Sec. Lts. (A. and S.):—C. S. W. Hall, L. E. F. Dale, April 11th. G. M. Ferguson, April 21st. F. J. H. Bacon, April 24th. F. G. Alpin, April 25th. H. C. Armitt, B. Brewer, L. A. W. Galloway, R. E. H. Gould, J. H. Holley, H. Randle, W. F. Smith, E. R. Walker, J. M. Walmsley, L. F. Wilson, April 26th. J. Prescott, April 30th. R. A. Hodgson, May 3rd.

The following are granted temp. commns. as Sec. Lts. (Obsr. Officers).—F. Lodge, April 8th. E. E. Gowing, J. L. Smith, C. Taylor, April 12th. E. Darby, April 17th. F. W. Fox, April 22nd.

Lt. H. Ross relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lt., May 18th.

Sec. Lt. H. A. C. Martyr relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Sec. Lt., May 18th.

Technical Branch.—Capt. G. W. Williamson, M.C., to be Capt. (Tech.), from S.O., April 5th.

The following are granted temp. commns. as Sec. Lts.:—B. H. Lodge (Lt., Lond. R., T.F.), and to be Hon. Lt.; R. B. Robinson (Sec. Lt., Lond. R., T.F.); V. Smith (Sec. Lt., R.G.A., Spec. Res.); A. H. Denly (Sec. Lt., Lond. R.); J. W. J. Bates (temp. Sec. Lt., attd. D. of Corn. L.I.), April 6th. G. M. Bell (Sec. Lt., Norf. R., Spec. Res.), April 12th.

Sec. Lts. (Admin.) to be Sec. Lts. (Tech.):—W. T. Barber (from Admin.), April 1st. B. B. Long (from Admin.), R. J. Hibberd (from Admin.), April 6th. F. Simpson (from Admin.), April 7th. F. L. G. Ghisi (from Admin.), April 17th.

Administrative Branch.—The following are granted temp. commns. as Lts., and to be temp. Capts. while empld. as Admin. Capts.:—F. V. Bell (temp. Lt., New Armies), F. W. Romney (temp. Lt. in Army), April 1st.

To be temp. Capts. while empld. as Admin. Capts.:—W. R. Kerr (temp. Capt. in Army), April 1st, and is granted a temp. commn. as Capt.; H. M. Ryland (Qrmr. and Hon. Capt., Lond. R., T.F.), and is granted a temp. commn. as Capt., April 12th; Lt. G. J. M. Peel, April 30th; Lt. P. R. Hutchinson (substituted for notification which appeared in the "Gazette" May 7th), May 12th.

Lt. H. F. W. Bailey to be Admin. Lt. (from A. and S. Officer), April 1st.

Lt. C. A. Stiles to be Admin. Lt. (from K.B. Officer), April 1st.

To be temp. Lts. while empld. as Admin. Lts.:—C. S. Bignell (temp. Lt., K.O.S.B.), and is granted a temp. commn. as Lt.; Sec. Lt. H. S. Counsell; G. M. Darragh (temp. Lt. in Army), and is granted a temp. commn. as Lt.; R. T. Kelly (temp. Sec. Lt. L'pool R.), and is granted a temp. commn. as Sec. Lt.; D. T. McGuire (Sec. Lt., Glos. Yeo., T.F.), and is granted a temp. commn. as Sec. Lt.; Sec. Lt. G. B. Redgrave; Lt. F. Worswick, April 1st; C. D. Wooldridge (Lt., Hants R., S.R.), and is granted a temp. commn. as Lt., April 3rd; C. P. Browne, (Lt., Notts and Derby R.), and is granted a temp. commn. as Lt., April 5th; A. R. Harris (temp. Lt. in Army), and is granted a temp. commn. as Lt., April 8th; F. W. Napper (Capt., R., Sussex R.), and is granted a temp. commn. as Lt. (Hon. Capt.), April 24th; Sec. Lt. R. Swan, April 26th; Sec. Lt. H. W. Prockter, May 6th.

The following is granted a temp. commn. as Capt.:—A. G. N. Belfield, May 10th.

The following is granted a temp. commn. as Lt.:—J. H. Evans (Temp. Lt., A.S.C.), April 26th.

The following are granted temp. commns. as Sec. Lts.:—C. O. Coton (Temp. Lt., R. Ir. Rif.), and to be Hon. Lt.; H. E. Evennett (Temp. Sec. Lt., S. African Labour Corps); H. F. G. Findlay (Sec. Lt., Glasgow Yeo., T.F.); A. Hancock (Sec. Lt., Middx. R., Spec. Res.), April 2nd; F. C. Payne (Temp. Sec. Lt., Labour Corps, April 4th; H. Gamage, May 3rd; R. T. Smith, May 5th; G. E. Pyne, May 10th.

Sec. Lt. C. Flanagan relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lt., May 18th.

Sec. Lt. J. B. Mann resigns his commn., May 18th.

Sec. Lt. J. J. O'Loughlin resigns his commn., (May 18th).

Memoranda.—Lt. R. H. Whittington to be temp. Capt. (without the pay and allowances of that rank) whilst specially empld., May 9th.

Lt. (Capt. Can. Army Pay Corps) J. G. Garneau relinquishes his commn. on ceasing to be empld., April 29th.

War Office, May 18th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Staff Officer, 3rd Cl.—(Graded as a Staff Capt.)—The date of the appt. of Lt. V. Buxton, Leic. R., is Oct. 22nd, 1917, and not as in the "Gazette" of Feb. 2nd.

Flt. Comdr.—Capt. W. R. B. Gifford, Middx. R., Spec. Res., (Jan. 8th, seny. from Aug. 25th, 1917). (Substituted for the notification in the "Gazette" of Feb. 15th); Lt. R. S. Carroll, Spec. Res., from a Flying Officer, and to be temp. Capt; whilst so empld., March 1st.

The following cease to be graded for purposes of pay as Sqdn. Comdrs. whilst empld. at a School of Special Flying:—Lt. (temp. Capt.) (now temp. Maj.) E. J. L. W. Gilchrist, M.C., Lrs. Spec Res., Nov. 26th, 1917; Lt. H. H. Balfour, M.C., K.R.R.C., Spec. Res., Nov. 21st, 1917.

Schools of Instrn.—Schools of Mil. Aeronautics.—Instr. (graded as an Equipt. Officer, 1st Cl.).—Temp. Lt. G. L. Sly, Gen. List, from an Asst. Instr. (graded as an Equipt. Officer, 2nd Cl.), and to be temp. Capt. while so empld., March 23rd.

* * *

The Government of India has forwarded the following list of Officers, whose names have been brought to notice by Lt.-Gen. Sir A. A. Barrett, K.C.B., K.C.S.I., K.C.V.O., for valuable services rendered during the operations against the Mahsuds, March-August, 1917:—

Royal Air Force (Military Wing).

Fletcher, Lt. (Temp. Capt.) H. A.; Robinson, Sec. Lt. E. R. A.; New, No. 1555 Serjt. (now Flt.-Lt.) J.

War Office, May 20th.

The following officers, N.C.Os., and men of the R.A.F. are mentioned in a dispatch, dated April 7th, which has been received by the Secretary of State for War from Field-Marshal Sir Douglas Haig, K.T., G.C.B., G.C.V.O., K.C.I.E., Commander-in-Chief of the British Armies in France. The dispatch covers the period from Sept. 25th, 1917, to midnight, Feb. 24th-25th, 1918:—

STAFF.

Becke, Maj. and Bt. Lt.-Col. (Temp. Brig.-Gen.) J. H. W., D.S.O., N. and Derby R.; Brooke-Popham, Maj. and Bt. Lt.-Col. (Temp. Brig.-Gen.) H. R. M., D.S.O., O. and B. L.I.; Charlton, Maj. and Bt. Lt.-Col. (Temp Brig.-Gen.) L. E. O., C.M.G., D.S.O., Lan. Fus.; Festing, Maj. and Bt. Lt.-Col. (Temp. Brig.-Gen.) F. L., C.M.G., Northd. Fus.; Salmond, Maj. and Bt. Lt.-Col. (Temp. Maj.-Gen.) J. M., C.M.G., D.S.O., R.A.F.; Selwyn, Capt. J., R.A. and Gen. Staff, attd. H.Q.

J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.,
104, Criterion Works, Birmingham.

1336



Contractors to H.M. Government.

Rotax

Makers of Aeroplane Fittings

Electric Equipment for Heating and Lighting.

Streamline Wires and Fittings.

Prompt Deliveries.

AERO WIND SHIELDS.

"Labyrinth" Relief Valves, Oil and Petrol Fillers, Pressure Pumps, Petrol Filters, Taps and Brass & G.M. Fittings generally.

Water Joint Clips, Turnbuttons, Shackles, and Small Parts.

Prices and Particulars on receipt of Enquiries.

NOTE.—We have an Illustrated Catalogue of our Aeroplane Fittings. Write us and we will send you a copy.

THE ROTAX MOTOR ACCESSORIES CO., LTD.,

WILLESDEN JUNCTION, N.W.10.

P.C.B. 7.

R.F.C. and R.A.F.

Baker (Temp. Capt.) B. E., D.S.O., M.C., Gen. List; Baldwin, Lt. (Temp. Lt.-Col.) J. E. A., Hrs.; Barratt, Capt. (Temp. Lt.-Col.) A. S., M.C., R.A. and H.Q., R.A.F.; Bean, Temp. Capt., H. H. W., Gen. List; Bettington, Capt. (Temp. Lt.-Col.) A. V. (S.R.); Bettington, Temp. Maj. E. M., Gen. List and R.A.F.; Blackburn, Capt. (Temp. Lt.-Col.) H., M.C. (S.R.); Bowman, Lt. (Temp. Maj.) G. H., D.S.O., M.C., R. War. R.; Brambleby, Temp. Lt. P. M., Gen. List; Briscoe, Temp. Sec. Lt. (Temp. Capt.) E. J., Gen. List; Bullen, Sec. Lt. (Temp. Maj.) T., Som. L.I.

Campion, Sec. Lt. (Temp. Capt.) J D. (S.R.); Carter, Maj. A. D., D.S.O., New Brunswick R.; Clark, Temp. Sec. Lt. W. C., Gen. List; Compston, Flt. Comdr. R. J. O., D.S.O., R.A.F.; Crawford, Temp. Sec. Lt. O. G. S., Gen. List; Curtiss, Sec. Lt. (Temp. Capt.) E. F. B. (S.R.).

Donald, Sec. Lt. (Temp. Capt.) R. (S.R.); Douglas, Lt. (Temp. Maj.) W. S., M.C., R.F.A. (S.R.); Draper, Sqdn. Comdr. C., R.A.F.; Drowley, Temp. Lt. T. E., Gen. List; Drudge, Temp. Capt. E., Gen. List; Drysdale, Temp. Maj. J. D., Gen. List; Duffus, Lt. (Temp. Maj.) C. S., M.C. (S.R.).

Emery, Lt. (Temp. Capt.) P. G. (S.R.); Everton, Temp. Lt. W. B., Gen. List.

Farringdon, Lt. (Temp. Capt.) W. B., D.S.O., N. and Derby R.; Flavell, Sec. Lt. A. C., Mon. R.; Forrest, Lt. (Temp. Capt.) W. F. N., R.F.A. (S.R.); French, Lt. C. C., R.F.A. (S.R.), attd. Balloon Section.

Garrod, Capt. (Temp. Maj.) A. G. R., M.C., Leic. R.; Gordon-Duff, Lt. (Temp. Capt.) G. E., Cam. Highrs.; Gould, Capt. (Temp. Lt.-Col.) C. G. S., R.A. and R.A.F.; Gray, Lt. (Temp. Maj.) A., M.C., A. and S. Highrs.

Havers, Lt. (Temp. Capt.) E. W. (S.R.); Hembrough, Lt. J. R., R.A.F. (S.R.); Higham, Temp. Sec. Lt. J. A., Gen. List; Hodgson, Lt. (Temp. Capt.) F. H. (S.R.) Holt, Capt. (Temp. Maj.) A. V., R. Highrs.; Hooper, Capt. (Temp. Maj.) A. F. A., N. Staff. R.; Howard, Temp. Lt. A., Gen. List; Hynes, Capt. (Temp. Col.) G. B., D.S.O., R.A. and R.A.F.

James, Lt. (Temp. Maj.) A. W. H., M.C., Hrs.,; Johnson, Temp. Capt. E. D., Gen. List; Jones, Sec. Lt. W. W., Lond. R.

Langridge, Hon. Capt. and Qrmr. E. J., N. Staff. R.; Lindquist, Lt. (Temp. Capt.) O. (S.R.); Lloyd, Lt. (Temp. Capt.) G. L., M.C., Yeo.; Lockwood, Sec. Lt. E. E., K.R.R.C.

McCudden, Sec. Lt. (Temp. Capt.) J. T. B., V.C., D.S.O., M.C., M.M., Gen. List; McGlashan, Temp. Sec. Lt. A. F., Gen. List; McKeever, Sec. Lt. (Actg. Capt.) A. E., D.S.O., M.C. (S.R.); Maden, Temp. Capt. F., Gen. List and R.A.F.; Meech, Temp. Lt. R. G., Gen. List; Mellanby, Lt. (Temp. Capt.) T. G. (S.R.); Murray, Lt. (Temp. Maj.) K. D. P., M.C. (S.R.).

Neale, Temp. Sec. Lt. (Actg. Capt.) G. B., Gen. List; Neame, Maj. A. L. C., R.E.; Nickalls, Lt. J. P., R.A. and R.A.F.

O'Connell, Temp. Lt. J. H., Gen. List.

Packe, Lt. (Temp. Capt.) E. A., O. and B. L.I.; Palmer Temp. Capt. (Temp. Maj.) E. B., A.S.C.; Paul, Capt. H. W. M., M.C., Middx. R.; Pearson, Temp. Capt. W. R. G., Gen. List; Pybus, Temp. Sec. Lt. E., Gen. List.

Read, Lt. (Temp. Capt.) J. V. (S.R.); Rendle, Lt. (Temp. Capt.) J. E. (S.R.); Russell, Temp. Capt. F. X., R. Mun. Fus.; Ryan, Capt. C. E., M.C., R.F.A.

Scudamore, Temp. Capt. R. C., M.C., Gen. List (killed); Sewell, Capt. (Temp. Maj.) J. P. C. (S.R.); Shelton, Sec. Lt. (Temp. Capt.) K., E. Kent R. (S.R.) (died of wounds); Shephard, Bt. Lt.-Col. (Temp. Brig.-Gen.) G. S., D.S.O., M.C., R. Fus. and R.A.F. (killed); Sibley, Lt. (Temp. Capt.) S. J. (S.R.); Snow, Lt. (Temp. Maj.) W. R., D.S.O., M.C. (S.R.); Sutton, Lt. (Temp. Maj.) B. E., D.S.O., M.C., Yeo.

Thomas Lt. (Temp. Capt.) O. V. (S.R.); Thomas, Temp. Capt. F. S., Gen. List; Toms, Lt. (Temp. Capt.) B. B., R. War. R. (S.R.); Trapp, Actg. Flt. Lt. G. L., Naval Sqdn.; Trotter, Lt. (Actg. Maj.) J. F. A., R.F.A. (S.R.); Twist, Temp. Lt. (Temp. Capt.) T. K., Gen. List.

van Ryneveld, Temp. Lt.-Col. H. A., M.C., Gen. List; Vernon, Sec. Lt. (Temp. Capt.) R. T. (S.R.).

Walker, Sec. Lt. G. G., N. Lan. R.; Walmsley, Temp. Capt. H. H., Gen. List; Waterlow, Temp. Sec. Lt. E., Gen. List; Wiggin, Temp. Capt. A. B., Gen. List; Wightman, Temp. Maj. G. L., Gen. List; Worthington, Temp. Capt. P., Gen. List.

Young, Sec. Lt. H. N., Gen. List.

Barry, 21786 Serjt. F.; Corpe, 17971 Cpl. F. P.; Field, 13876 Flt. Serjt. F. W.; Guthrie, 2355 Temp. Serjt.-Maj. S. J.; Hagan, 113763 Serjt. J. C.; Halliday, 8111 Cpl. P.; Harrison, 33699 Cpl. J.; Jarrett, 15864 Flt. Serjt. F. C.; Jones, 107453 Serjt. J. H.; King, 279 Serjt.-Maj. C. E., D.C.M.; Lee, 13962 Flt. Serjt. G. E.; Lovelock, 6533 Serjt. H.; Meazza, 11592 Serjt. L. E. V.; Newson, 43984 2nd Cl. Air Mech., F. S., R.G.A.; O'Shea, 12142 Flt. Serjt. J. E.; Parren, 19533 Cpl. E.; Roberts, 49043 Serjt. J. R.; Rose, 23648 Serjt. H. J.; Ryan, 113031 Serjt. J.; Sidebotham, 2235 Flt. Serjt. G. H.; Smith, 34430 Serjt. E.; Smith, 45296 Serjt. S. A.; Taylor, 38361 Cpl. E.; Udell, 8078 Serjt. F. J.; Varey, 21835 Serjt. H.

FROM THE COURT CIRCULAR.

Buckingham Palace, May 15th.

The Right Hon. Sir William Weir (Secretary of State for the Royal Air Force) had an audience of the King this morning.

Buckingham Palace, May 16th.

Lt. Duncan Grinnell-Milne, Royal Fusiliers and Royal Air Force, had the honour of being received by The King.

OFFICIAL COMMUNIQUES.

MILITARY.

G.H.Q. Communiqués.

May 14th, 8.58 p.m.—On the 13th inst. flying was only possibl for a few hours during the early part of the day. In this perio a great deal of work was done by our aeroplanes with the artil lery, many reconnaissances were carried out, and 500 bombs wer dropped by us on various targets.

In air fighting two hostile machines were brought down.

None of our machines is missing.

May 15th, 9.20 p.m.—On the 14th instant reconnaissances artillery work, photography, and bombing were carried out b our aeroplanes.

In air fighting six hostile machines were brought down an one other was driven down out of control. In addition, on German aeroplane was shot down by anti-aircraft gun fire an another by the fire of our infantry.

Two of our aeroplanes are missing.

Bombing was continued actively during the night, and 12 ton of bombs were dropped by us on the railway station at Lill Menin, Chaulnes, and Péronne, on billets at Bapaume, and i the area south of the Somme and on the docks at Bruges.

All our machines returned.

On the 15th instant a successful raid was carried out by us o the railway station and sidings at Thionville (16 miles north o Metz). Twenty-four heavy bombs were dropped, and burst were observed on the railway sheds and track and on th furnaces. The Carlshutte factory alongside the railway was h four times.

All our machines returned safely in spite of the heavy ant aircraft fire experienced by them when over their objectives.

May 16th, 10 p.m.—On the 15th instant a great deal of wor was done by our aeroplanes and observation balloons in co junction with our artillery. Long-distance reconnaissance were carried out throughout the day, and a great many phot graphs were taken in the enemy's forward and back areas.

Our bombing machines began their attacks at dawn an continued till dark, dropping in all a weight of over 24 ton of bombs. The targets included the railway stations at Tourna Courtrai, and Chaulnes, billets in the neighbourhood of Doua Bapaume, Menin, and the River Somme, and the Zeebrugg Bruges Canal.

Enemy aircraft were active in the early morning and agai in the evening hostile scouts attacking our bombing machine with particular insistence.

Twenty-five German machines were brought down and others were driven down out of control. One other hostile aer plane was shot down by machine-gun fire from the ground.

Eleven of our aeroplanes are missing.

After dark bombing was continued by our night-flying aer planes. Over 14 tons of bombs were dropped by us on th railway stations at Chaulnes, Lille, and Douai, the enemy billets at Péronne, Bray, and Bapaume, and the docks Bruges. One of our machines has not returned.

Early on the 16th inst. our aeroplanes set out to bomb th factories and railway station at Saarbrücken, in Germany. O crossing the lines they encountered 10 hostile scouts, and running fight took place along the whole way to our objective By the time Saarbrücken was reached 25 hostile machines ha collected and were attacking our aeroplanes with the utmo vigour.

In spite of these attacks, 24 heavy bombs were dropped b us on our objectives. Several bursts were seen on the railwa and a fire was started.

Having attained their objectives, our aeroplanes concentrate their efforts on fighting the enemy's machines, five of whic were brought down.

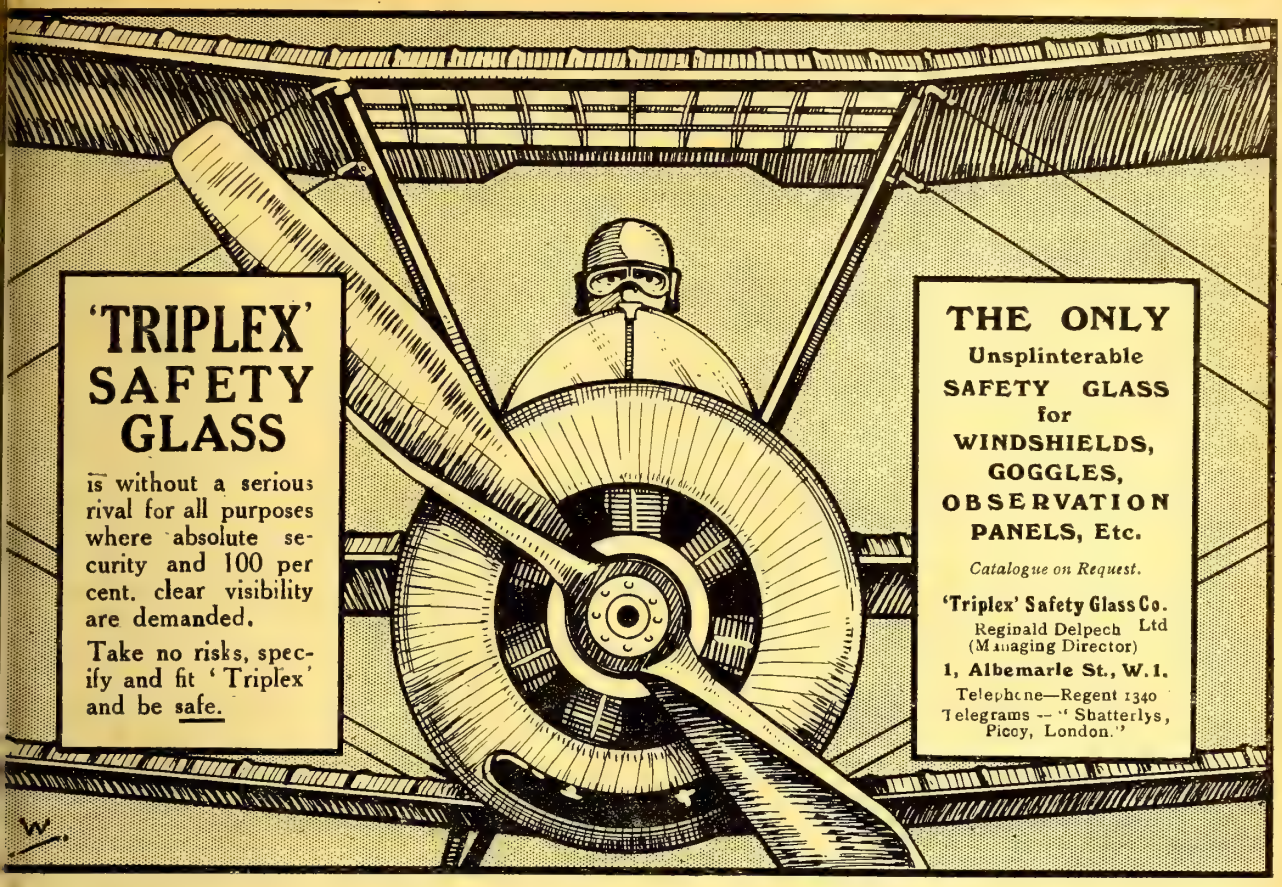
One of our aeroplanes also was seen to be shot down.

All our other machines returned.

May 17th, 9.33 p.m.—Great aerial activity prevailed on th 16th inst. Our observation balloons accomplished a large amou of registration for the artillery, and reported movements in th enemy's forward areas. Our aeroplanes carried out long-distan reconnaissances, artillery work, bombing, photography, an fighting throughout the day.

Over 23 tons of bombs were dropped on important railwa centres, aerodromes, and billets behind the enemy's lines.

Fighting was intense in the early morning and in the ever ing. Thirty hostile machines were brought down, and fiv others were driven down out of control. In addition two Ge man machines were brought down by anti-aircraft gunfire. Tw



'TRIPLEX' SAFETY GLASS

is without a serious rival for all purposes where absolute security and 100 per cent. clear visibility are demanded.

Take no risks, specify and fit 'Triplex' and be safe.

THE ONLY
Unsplinterable
SAFETY GLASS
for
WINDSHIELDS, GOGGLES, OBSERVATION PANELS, Etc.

Catalogue on Request.

'Triplex' Safety Glass Co.
Reginald Delpech Ltd
(Managing Director)
1, Albemarle St., W.1.
Telephone—Regent 1340
Telegrams—"Shatterlys, Picoy, London."

PRACTICAL FLYING

3/9 Net

COMPLETE COURSE of FLYING INSTRUCTION
By a FLIGHT COMMANDER.



THE FIRST PRACTICAL WORK on actual TRAINING and INSTRUCTION for the R.A.F. Written and illustrated by practical Flying Officers who have had considerable experience as instructors under Service conditions.

With an Introduction by Major-General W. S. BRANCKER, R.A.F.

OVER 100 ILLUSTRATIONS, Diagrams, etc. Special Pull-out Map, illustrating a Cross-Country Flight.

The following subjects are covered:

THE theory and practice of flight—Principles of aeroplane engines—The first lesson in the air—The first solo flight and aerodrome practice—The use and working of the instruments—Map reading (illustrated with special Ordnance Survey Maps)—Preparing for a cross-country flight—Cross-country flying—Advanced flying—Night flying, etc.

Everyone who takes an interest in Aviation will find in this work a very clear exposition of why an aeroplane flies, how it is flown, and the manipulation to produce apparently difficult "stunts."

ON SALE THIS WEEK.

Obtainable through any Booksellers; or post free from the Publishers 4/- net

TEMPLE PRESS LIMITED,
7-15, Rosebery Avenue, London, E.C.1.
Wholesale: E. J. LARBY, Limited, 30, Paternoster Row, London, E.C. 4.

WAR SERVICE MANUALS

"Practical Flying" is only one of many War Service Manuals
Write for complete list.

hostile machines landed behind our lines, and their occupants were captured.

Five of our machines are missing.

During the night our night-flying machines dropped a further 10½ tons of bombs on different targets, including the railway stations at Lille, Douai, and Chaulnes, billets in the neighbourhood of Bapaume, Péronne, and Rosières, and the docks at Bruges.

The enemy's night-flying machines were also active. One Gotha aeroplane landed behind our lines, and the crew were taken prisoners.

With reference to the report of the raid on Saarbrücken on the 16th inst., three hostile machines were driven down out of control on that occasion. The statement that five hostile machines were brought down is incorrect.

May 18th, 9.55 p.m.—On the 17th inst. the weather again favoured operations in the air, though at times visibility was poor.

A large amount of work was done by our artillery with aeroplane and balloon observation. Many photographs were again taken of the enemy's back areas, and the constant bombing attacks carried out by our aeroplanes during the last four days were continued. Over 22 tons of bombs were dropped by us on Tournai, Courtrai, and Chaulnes railway stations, on several hostile aerodromes, and on billets all along the front.

Hostile aircraft were not as active as on previous days, although large formations of German machines were encountered well east of the lines. Nineteen hostile aeroplanes were brought down and four others were driven down out of control.

Ten of our machines are missing.

On the same day over a ton of bombs were dropped by us on the railway station at Metz. Several bursts were seen on the track and on factories alongside the railway.

All our machines returned.

During the night our machines dropped 10 tons of bombs on Chaulnes, Haubourdin, Douai, and Marcoing stations, on Péronne, and targets in the neighbourhood of Bapaume.

Raids were carried out also during the night on Thionville and Metz railway stations. Thirty-two heavy bombs were dropped, and several direct hits obtained. A fire was started at Thionville.

One of our machines failed to return.

On the 18th inst. a most successful raid was carried out by us in broad daylight on the railway stations, factories, and barracks at Cologne, in Germany. Thirty-three bombs were dropped, and bursts were seen on the railway sheds. Our bombing machines were attacked by several hostile scouts, two of which were driven down out of control.

All our aeroplanes returned.

May 19th, 9.5 p.m.—On the 18th inst. another fine day enabled bombing reconnoitring, photographing, and fighting to be continued by our aeroplanes. Improved visibility made it possible to carry out slightly more work in conjunction with the artillery than could be accomplished during the past few days.

The railway stations at Courtrai, Valenciennes, Aulnoye, Roulers, and Chaulnes were heavily bombed by us, and several of the enemy's aerodromes, ammunition dumps, and billets were also attacked. A total weight of over 19 tons of bombs was dropped on these targets.

As on previous days, the greater part of the fighting took place well east of the lines. Twenty-one hostile machines were brought down and two others driven out of control.

Eight of our aeroplanes are missing.

After dark our bombing machines were only able to be at work during half the night owing to a thick mist which blew in from the sea. Ten tons of bombs were dropped by them on Marcoing, Haubourdin, Douai, and Chaulnes railway stations, on billets in the neighbourhood of Bapaume and Bray, and on the Solway Works and lock gates at Zeebrugge.

One of our machines failed to return.

May 20th, 11.10 p.m.—Another full day's work in the air was accomplished on the 19th inst. Our balloons and aeroplanes actively co-operated with our artillery observing the fire of our batteries and locating active hostile guns. The enemy's railway stations, aerodromes, dumps, and billets were again attacked by our bombing aeroplanes, which dropped over 17 tons of bombs.

Severe fighting took place well to the east of the line, where our bombing machines were attacked by large hostile formations. Three German observation balloons were destroyed by us, 27 hostile machines were brought down, and three others were driven down out of control. Twelve of our aeroplanes are missing.

After dark bombing was carried out vigorously both by us and by the enemy. Our machines dropped 15 tons of bombs on Chaulnes, Douai, Don, and Marcoing railway stations, St. Denis Westrem aerodrome, Bray, and Bapaume.

One of the enemy's large bombing machines was brought down in our lines by anti-aircraft gunfire.

All our machines returned.

On the 20th inst. a ton of bombs was dropped on the barrac gasworks, and railway station at Landau in Germany (nor west of Karlsruhe). The railway was hit several times and t fires were started.

All our machines returned.

War Office Communiqué.

May 17th.—The G.O.C. Palestine reports:—

On May 7th our aircraft executed a successful bombing ra on Amman railway station (30 miles north-east of the Dead Se on the Hedjaz railway, and on May 9th the enemy aerodro and railway station in the vicinity of Jenin (on the Cent Palestine Railway, 14 miles north of Samaria) were attacked our Air Service.

Home Command Communiqués.

May 20th, 12.30 a.m.—Hostile aircraft crossed the coasts Kent and Essex shortly after 11 p.m. to-night (May 19th), a proceeded towards London.

The raid is still in progress.

2.15 p.m.—Reports show that four of the enemy aeroplar which raided London and the South-East last night have be brought down.

The raid appears to have been on a large scale, and a co siderable number of bombs were dropped, but no details casualties or damage are yet available.

May 20th, 11.55 p.m.—A considerable number of Gotha aer planes appear to have taken part in last night's raid. It is r possible to give an exact figure, but probably between 20 a 30 machines participated.

A group of machines came in up the Thames Estuary abo 11 p.m., and skirted the North Kent coast on their way to Lo don, being heavily engaged by the A.A. Defences on their w inwards.

One of these machines was engaged at about 11.30 by British aviator, who fired at the raiders at close range until t machine disappeared from view in the clouds. Shortly afte wards she burst into flames at a height of about 7,000 feet, a fell a blazing wreck to earth.

The remaining other machines passed inland over Kent, dro ping bombs at various places without doing material damage.

Another group of raiders crossed the Essex Coast and ma its way towards London, where one machine was brought dow by gunfire. A few dozen bombs were dropped promiscuously certain parts of the London district, doing, in a few cases onl no inconsiderable damage to small dwelling-house property.

The casualties were, however, by no means heavy or propo tionate to the material damage.

All the raiders were hotly engaged by the A.A. defence Some of the enemy machines attempted to make their way dow the Thames Estuary, others proceeded eastwards overland; son may have been severely damaged during their attempt to pen trate the London defences. At least three more of them faile to effect their escape. Two were brought down before they ha crossed the coast, one of these being destroyed by a British avi tor. A fifth machine came down in flames into the sea and sixth is also reported to have been observed falling into the se though this report is not yet definitely confirmed.

Further reports make it appear that yet a seventh raider faile to reach home, but fell burning into the sea. This statement not yet corroborated by any more material evidence.

There is no further material change to record in the casualt list as given this afternoon; it now stands at 37 killed and 1 injured. Except for two outbreaks of fire occasioned in large premises, which were soon got under control, the damage wa confined to the wrecking of some small dwelling-houses by forc of explosion as well as to the breakage of much glass.

May 20th, 4.30 p.m.—The following are the casualties so fa reported in last night's air raid:—

LONDON METROPOLITAN POLICE DISTRICT AND CITY.

Killed.

Men	17
Women	14
Children	6
Total	37

Injured.

Men	83
Women	49
Children	23
Total	155

PROVINCES.

Killed.—Nil.

Injured.—Men, 2; women, 3; child, 1—total, 6.

Considerable damage to house property is reported.

W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.



SHENSTONE & Co., LTD.
AIRCRAFT DEP.
LEYTON.

AIRCRAFT PRODUCTION WITH MODERN METHODS.

E. KEITH DAVIES, General Manager. **Telephone: WALTHAMSTOW 24**

AERO-PLANE STEEL PARTS

When requiring Aeroplane Parts write US — we can supply —
Tubes & Tubular Construction, Sheet Metal Pressed Parts, Wheel Rims, Special Sections in Steel, Brazing, Acetylene and Electric Welding, etc.
Any Special Parts made to order. Send your enquiries.
The LOMBARD Rim and Tube Co., Birmingham.

THE CASUALTY LIST.

NAVAL.

Reported May 15th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Allison, Flt. Sub-Lt. J. L., R.N.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER.—Minifie, Actg. Flt. Comdr. R. P., D.S.C., R.N.

Reported May 16th.

DROWNED.—Nicholl, W., Aircraftman, 2nd Grade, F.39619.

MILITARY.

Reported May 15th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Craig, Sec. Lt. G. B., R.F.C.
Starfield, Sec. Lt. B., R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Kent Jones, Sec. Lt. D. W., R.E., attd. R.F.C.

AUSTRALIAN FORCE.—PRISONERS IN TURKISH HANDS.—Austin, Lt. R. A., A.F.C.
Lee, Lt. O. M., A.F.C.

CANADIAN FORCE.—PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED OR DIED OF WOUNDS.—Convery, Lt. J. A., Can. Cav., attd. R.A.F.
Gilmour, Lt. A. C., Can. Rly. Troops, attd. R.A.F.

WOUNDED.—Grant, Lt. E. G., Alta. R., attd. R.A.F.; Grimshaw, Lt. J., Man. R., attd. R.A.F.; Henderson, Lt. W. R. W., Man. R., attd. R.A.F.

Reported May 16th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.
Kirkman, Capt. K. R., M.C., R.F.C.
Lindsay, Sec. Lt. A. T. W., R.F.C.
Pickford, Sec. Lt. E. W., R.F.C.

Reported May 17th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Butt, Sec. Lt. A., Bedf. R., attd. R.F.C.
Hewett, Capt. H., M.C., R. Berks. R., attd. R.F.C.

Reported May 20th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Corbet, Sec. Lt. J. H., Shrops. L.I., attd. R.F.C.

AUSTRALIAN FORCE.—PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Love, Lt. H. K., A.F.C.

CANADIAN FORCES.—KILLED.—Skedons, Lt. C. E. L., Cent. Ont. R., attd. R.A.F.

MISSING.—Hustwitt, Lt. S. A., Can. Eng., attd. R.A.F.
Melanson, Lt. A. J., Can. For. Corps., attd. R.A.F.
Stuart-Smith, Lt. P. J., Can. Cav., attd. R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED WOUNDED AND PRISONER IN GERMAN HANDS.—McCann, Lt. C. M., Can. M.G.C., attd. R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN TURKISH HANDS.—Haight, Capt. W. L., W. Ont. Regt., attd. R.A.F.

Reported May 21st.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Kent, Sec. Lt. W. M., R.F.C.
Kilkelly, Capt. J. G. J., R. Muns. Fus., attd R.F.C.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Westfield, Lt F. J., Manch. R., attd. R.F.C.

CORRECTIONS.—PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Kent-Jones, Sec. Lt. D. W., R.E., attd. R.F.C., should read Kent-Jones, Lt. D. W., R.E., attd. R.F.C.

* * *

CASUALTIES AMONG N.C.Os. AND MEN.
THE DATES ARE THOSE OF THE OFFICIAL LIST.

DIED.

MAY 9th.—A.F.C.—Grigson 19826 S.

ACCIDENTALLY KILLED.

MAY 9th.—A.F.C.—Needham 27571 G. F. J

AIR FORCE.

Reported May 16th.

KILLED.—Ashworth, Sec. Lt. R. W., Hants R., attd. R.A.F.
Ball, Sec. Lt. F. E., Gen. List and R.A.F.
Barrett, Sec. Lt. L. K. W., Gen. List and R.A.F.
Bates, P/F.O. C. M., R.A.F.
Chamberlin, Sec. Lt. J. B., Gen. List and R.A.F.
Eyden, Capt. H. (M.C.), R.G.A. and R.A.F.
Exley, Sec. Lt. A. T., Northd. Fus. and R.A.F.
Goy, Lt. E. G., R.A.F.
Mortimer, Sec. Lt. E. G. S., Gen. List and R.A.F.
Robinson, Lt. H. E., Gen. List and R.A.F.
Sturgess, Sec. Lt. G. M., Essex R. and R.A.F.
Whitwell, Sec. Lt. P. H., Yorks. Regt., attd. R.A.F.

WOUNDED.—Anderson, Sec. Lt. N. McC., Gen. List and R.A.F.; Beart, Lt. W., R.F.A. (S.R.) and R.A.F.; Bissett, Lt. D. M., Gord. Highrs. and R.A.F.; Brooke, Capt. A. F., Gen. List and R.A.F.; Burgess, Lt. H. G., S. Staffs, attd. R.A.F.; Kingwill, Sec. Lt. W. L., Norf. Regt., attd. R.A.F.; Magoun, Sec. Lt. F. P., Gen. List and R.A.F.; McKeagu Sec. Lt. H. W., Gen. List and R.A.F.; Paisley, Sec. Lt. J. Gen. List and R.A.F.; Pottie, Lt. M. J., Sea. Highrs. (T.F attd. R.A.F.; Powell, Capt. E. C., R. Welsh Fus., att R.A.F.; Rendell, Lt. L. P., Gen. List and R.A.F.

MISSING.—Bion, Lt. R. E., Hussars (S.R.) and R.A.F.; Coomb Sec. Lt. A. S. N., Gen. List and R.A.F.; Lewis, Sec. D. G., Gen. List and R.A.F.; Liddell, Sec. Lt. M. H. Sco. Rif. (T.F.) and R.A.F.; Marion, Sec. Lt. R. J., Ge List and R.A.F.; Mason, Sec. Lt. C. J., Gen. List and R.A.F Raymond-Barker, Maj. R., M.C., Gen. List and R.A.F Wright, Sec. Lt. S. S., Gen. List and R.A.F.

Reported May 17th.

KILLED.—Betts, Sec. Lt. C. C., R.A.F.
Black, Sec. Lt. D. C., R.A.F.
Clayton, Sec. Lt. J. A., R.A.F.
England, Sec. Lt. N. H., R.A.F.
Lamb, Sec. Lt. E. W. P., R.A.F.
Sutton, Sec. Lt. H. L., R.A.F.

WOUNDED.—Black, Sec. Lt. I. S., R.A.F.; Good, Sec. Lt. J. R.A.F.; Holliday, Sec. Lt. J. O., R. Muns. Fus., attd. R.A.F Lane, Sec. Lt. W. I. E., R.A.F.; Lloyd-Rees, Sec. Lt. G. R.A.F.; Odlum, Lt. D. G. J., Manch. R., attd. R.A.F Taylor, Sec. Lt. H. L., R.A.F.

MISSING.—Allan, Capt. J. R., R.A.F.; Balfour, Lt. B., Lon R. (T.F.) and R.A.F.; Robinson, Sec. Lt. B. W., R.A.F Stroud, Lt. E. H. N., R.A.F.; White, Lt. C. G., R.A (T.F.), attd. R.A.F.

Reported May 18th.

KILLED.—Blythe, Sec. Lt. W. E. H., R.A.F.
Brabrook, Sec. Lt. E. J., Lond. R. (T.F.), attd. R.A.F.
Cuthbertson, Lt. G. C., M.C., R.A.F.
Edwards, Sec. Lt. F. G., R.A.F.
McHattie, Lt. J. W., York and Lanc. R. (T.), attd. R.A.F.
Salmons, Sec. Lt. W. J., R.A.F.
Winton, Sec. Lt. H. B., R.A.F.

WOUNDED.—Best, Lt. R. D., A.S.C. (T.) and R.A.F.; Be sher, Capt. P., R.A.F.; Hart, Sec. Lt. R. G., R.A.F.; Ma Kay, Lt. A. W., R.A.F.; McCoo, Sec. Lt. W. R., R.A.F Rogers, Sec. Lt. G. H., R.A.F.; Scaramanga, Sec. Lt. J. R.A.F.; Walkerdine, Sec. Lt. H. J. (M.C.), R.A.F.

MISSING.—Begbie, Lt. S. C. H., E. Surr. R. and R.A.F.; East Sec. Lt. W. H., R.A.F.; Magor, Capt. G. A., R.A.F Prescott, Sec. Lt. L. W., R.A.F.

PRISONER OF WAR.—Rudman, Sec. Lt. W. (M.C.), Wilts R attd. R.A.F.

Reported May 20th.

KILLED.—Brown, Sec. Lt. C. A., R.A.F.
Butler, Sec. Lt. F. C., R.A.F.
Eddleston, Sec. Lt. A., R.A.F.
Hackman, Sec. Lt. C., R.A.F.
Kearney, Sec. Lt. N. C., R.A.F.
Palmer, Lt. B. B., R.A.F.
Ward, Sec. Lt. F. M., R.A.F.

WOUNDED.—Bolitho, Sec. Lt. A. W., R.F.A. (T.F.), att R.A.F.; Brent, Lt. V., Middx. R., attd. R.A.F.; Brow Sec. Lt. H. M., R.A.F.; Curtis, Lt. C., R.A.F.

MISSING.—Baker, Lt. A. N., R.A.F.; Duce, Lt. W., Lond. (T.), attd. R.A.F.; Gillan, Lt. C. J., R.A.F.; Stovin, Se Lt. F. C., R.A.F.

PERSONAL NOTICES.

NAVAL.

Flt. Sub-Lt. Douglas B. G. Francis, R.N.A.S., has bee awarded the Royal Humane Society's medal for keeping h mechanic afloat, though himself badly injured, when the machine fell into the Humber from a height of 400ft.

MILITARY.

DEATHS.

ANKETELL.—Sec. Lt. Charles Edward Anketell, M.M R.A.F., was killed in action on May 11th. He was 23 years age.

GARNONS WILLIAMS.—Capt. Alexander (Alex) Aylme Curtis Garnons Williams, M.C., 24th (South Wales Borderers attd. R.A.F., who was killed whilst flying on May 14th, was th only son of the late Capt. A. H. Garnons Williams, R.N., an Mrs. Garnons Williams, of Oakhill House, Horsham, an grandson of the late Prebendary Garnons Williams, of Aber carnlais, Brecon, and William C. Ward, Esq., of Victoria British Columbia, aged 22.

On the outbreak of the war Capt. Garnons Williams joined th Motor Cycle Dispatch Riders. In October, 1914, he was gazette to the South Wales Borderers. He was seriously wounded in th second battle of Ypres, in May, 1915, returned to France September, 1915, and went through the battles of Loos and th Somme. He was awarded the Military Cross in September 1916

HEPWORTH.—Lt. Arthur Montagu Hepworth, M.C., R West Surrey Regt., attd. R.A.F., was killed on May 4th in hi 32nd year. He was educated at Eastbourne College. Whe

JEWELLERS BY APPOINTMENT SILVERSMITHS



Patent No. 11976/15

THE "MILITARY" LUMINOUS WATCH.

A THOROUGHLY reliable and practical luminous watch, indispensable for Naval or Military Service. The "Military" Luminous Watch is the only Screw Case Silver Watch fitted with a "hunter" cover, and is the exclusive patent of The Goldsmiths and Silversmiths Company, Ltd.

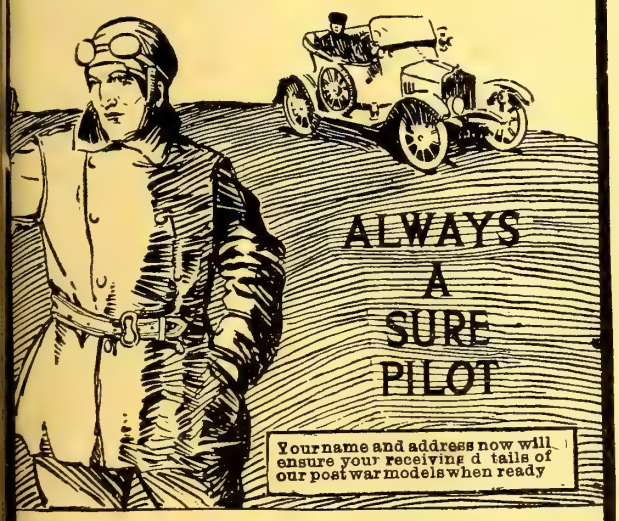
As illustrated. £4 12 6 Without Cover. £3 15 0

THE GOLDSMITHS & SILVERSMITHS COMPANY, LTD. with which is incorporated The Goldsmiths Alliance Ltd Established 1751

Only one Address (no branches):

112, REGENT STREET, LONDON, W.

The All British Standard LIGHT CAR



The Standard Motor Co., Ltd., Coventry.

London Agents: The Pytchley Autocar Car Co, Ltd., 216, Gt. Portland Street, W.

Burberry R.A.F. Safeguards

made in materials which are as impenetrable as leather but ventilate naturally and avoid condensed moisture, which is produced on the inner surface of air-tight fabrics.

The BURBERRY AIR-WARM

provides a lightweight, yet warm and dependable, defence against rain, mist or cold wind.

The inside is of luxuriously soft, thick Camel Fleece. The coat is workmanlike in every detail, and has nothing about it to catch in any part of the machine.

Its two parts can be worn separately or together—the outside alone providing a Weatherproof that excludes wet or wind without rubber or other airtight material; the Fleece lining, a smart British Warm; and the two together the staunchest self-ventilating safeguard possible.

Military Catalogue sent on request.



During the War Officers' Service Burberry Weatherproofs Cleaned and Re-proofed FREE OF CHARGE.

Complete R.A.F. Kits in 2 to 4 Days or Ready for use.

BURBERRYS Haymarket S.W. 1. LONDON

8 & 10 Bd Malesherbes PARIS; also Provincial Agents

SANKEY

Undershields & other Light Stampings for Aeroplanes

Any size or weight: Rough or Machined: Single piece or Combination pressed and welded by Oxy-acetylene and other processes.

JOSEPH SANKEY & SONS Ltd

Hadley Castle WELLINGTON Shropshire

war broke out he was at Penang, in the Malay Straits, where he had been for some time in a machine-gun section of the Malay States Volunteers. As soon as he was able to settle up his business affairs he sailed for England and in January, 1915, was given a commission in the Queen's. In July, 1915, he went to Gallipoli with his battalion, and was in the landing at Suvla Bay and the battle of Chocolate Hill. He remained in the Peninsula till the evacuation, and was during the greater part of the time brigade staff captain. He was mentioned in dispatches, and was awarded the Military Cross. On leaving Gallipoli his battalion went to Egypt, where he was given command of a company and the acting rank of captain, which he held for over two years. In September, 1917, he transferred to the R.F.C., and was posted to a squadron last March.

LORD and GEORGE.—Lt. John Stone William Lord, R.A.F., and Lt. Leslie George, R.A.F., both of Sydney, New South Wales, were killed on May 12th near Winchester They enlisted together, served in Egypt with the Australian Light Horse, and afterwards transferred to the R.F.C.

LUTYENS.—Lt. L. F. Derek Lutyens, R.A.F., whose death was announced last week, was educated at Elstree and Aldenham, and enlisted in the Royal Fusiliers (10th Battalion) in August, 1914, shortly afterwards obtaining his commission in the same regiment. He went to France with his regiment in 1915, and remained there as bombing officer until after the battles of Pozières and La Boiselle, when he transferred to the Royal Flying Corps. He fought many engagements as "observer," and was eventually appointed to an experimental squadron.

The body of David Hugh Pinsent, a civilian observer, who was killed while flying with Lt. Lutyens on an experimental flight a week ago, was found on May 14th in the Basingstoke Canal.

MOORE.—Lt. Clive Goulding Moore, Royal Fusiliers and R.F.C., who was posted as missing on Aug. 15th, 1917, and is now reported to have been killed on that date while flying over the German lines, was the son of Mr. R. E. Moore, barrister, of the Middle Temple, and 42, Acacia Road, and Mrs. Moore. He was educated at Loudoun House School, N.W., and Radley College, whence he was to have passed on to Trinity College, Cambridge. But on the outbreak of war he at once decided to join the Army. After a few weeks in the Inns of Court O.T.C., he was granted a commission in the Royal Fusiliers, and went out to France with his battalion in November, 1915. After five months in the fighting line he contracted diphtheria and was invalided home. On recovering, he joined the R.F.C., got his "wings," and again went out to France. He met his death when engaged on the dangerous task of flying low over the German lines to disperse with machine-gun fire the enemy troops massing for a counter-attack. He was a keen oarsman, and while at Radley won several rowing trophies, including the "silver sculls." He was a corporal in the school O.T.C. and an excellent shot, and both in 1913 and 1914 was a member of the team chosen to represent the school at Bisley.

SANKEY.—Sec. Lt. C. M. Sankey, M.C., The Buffs, attd. R.A.F., who was accidentally killed on May 15th whilst flying, was the only son of Major and Mrs. W. Sankey, of Wouldham, Tring Avenue, Ealing, and dearly-beloved brother of Mrs. Charles Cock. He was 21 years of age.

SOTHAM.—Lt. R. C. Sotham, R.W. Kents, attd. R.F.C., who was previously reported missing on Jan. 9th, has been reported killed in action on that date. He was the youngest son of the late George Sotham and Mrs. Sotham, of Horley, Surrey, and was 23 years of age.

VON POELLNITZ.—Major Herman Walter von Poellnitz, Lincolnshire Regt. and R.A.F., who died on May 11th abroad as the result of a motor accident, was the only child of Baron and Baroness Poellnitz, Blacklee, Sidcup, and grandson of the late Sir Walter Elliot, K.C.S.I., of Wolfelee, Hawick. He was 27 years of age.

WADE.—Lt. Richard Curtis Wade, R.F.C., whose death was announced recently, joined the King's Shropshire L.I. in September, 1914, and served for 13 months at the front. He was gazetted to the R.F.C. in September, 1917, and returned to the front the same month.

WINMILL.—Lt. Westropp Orbell Peyton Winmill, Bedfordshire Regt., killed on March 22nd, aged 23, was the elder son of the late George Winmill and Mrs. Winmill, Bedford. He was educated at the Bedford School, which he entered in 1903 and left in 1911 to join the engineering department of the Great Eastern Railway. When war broke out he enlisted in the Essex Regt., and in January, 1915, was nominated by the Army Council to the Royal Military College, Sandhurst. Passing out in May, he was gazetted to the Bedfordshire Regt., and went to France in June, 1915. After seven months in the trenches he was attached to the R.F.C., and was out there five months as observer. In June, 1916, he came home and gained his pilot's certificate in November, 1916, and took a course in aerial gunnery. On account of his nerves he was told that he must not fly for some time and was appointed an instructor. In October, 1917, as the Medical Board still would not permit him to fly, he asked and obtained permission to rejoin his old regiment, and went back to the front in December, 1917. Mr. Winmill married in 1917 Myfanwy, daughter of Mr. R. Clarke and the late Mrs. Clarke, of Reading.

MARRIAGE.

SELBY—BARTRUM.—On May 15th, at the Chapel Ro Savoy, Capt. J. G. Selby, M.C., R.F.A., R.F.C., son of and Mrs. H. T. Selby, of Northfield, Bromley, Kent, married to Dorothy, younger daughter of Mr. and Mrs. Bartrum, of Coniston, Bromley, by the Rev. Hugh B. Chapm

BIRTH.

CHADWICK.—On the 17th May, at 15, Irton Road, Sou port, the wife of Major R. Chadwick, M.C., R.A.F.—of a s

* * *

The appointment of Brevet Lieut.-Col. W. G. H. Salmo D.S.O., R.A., to be temp. Major-General, as notified in "Gazette" of May 17th, will be welcomed by all who h served under that able officer. As various dispatches from cessive General Officers Commanding the British Army in Eastern Mediterranean have shown, General Salmond has b for a considerable time in command of R.F.C. units in Eg and in the various forces which come under that comma Under his leadership the work of the R.F.C. in that area been uniformly good, and besides controlling troops in the f he has organised vast training establishments with complete cess. None is better qualified than he for the command of increased forces which he now has under him, and all will h that his recent promotion may be merely another step forw in his distinguished career.—C. G. G.

* * *

The "Times" correspondent writing from The Hague May 18th states that the following officers have arrived Schevengen for internment:—

Castle, Lt. W. F. L., R.A.F.; Chaloner, Capt. Hon. T. P. L., Yorks R. and R.A.F.; Connolly, Lt. T. P., 20th Nort Fus.; de Cologan, Capt. A. T. B., Lond. R. (L.R.B.); El Lt. W. B., A.S.C., attd. R.A.F.; Harvey, Lt. E. B., Lond. attd. R.A.F.; Kerr, Lt. C., R.A.F.; MacIntyre, Lt. D. H., and S. H., attd. R.A.F.; Toone, Lt. J. W., R. Ir Regt. R.A.F.; Van Nostrand, Lt. C. L., R.A.F.

AIR FORCE.

DEATHS.

CRANE.—The funeral took place on May 20th of Sec. Mortimer Crane, R.A.F., who was accidentally killed wh flying in this country a few days earlier.

Mr. Crane, who was the only child of Mr. T. I. Crane, a w known Philadelphia business man, was educated at Yale Univ sity, and although under age attempted to join the Canadi Forces before the United States entered the war. He joined American Army immediately on the declaration of war, and w in training for some time at Niagara; but desiring to get i active service as soon as possible, he obtained his dischar joined the British Air Forces in Canada, and, after training th and in Texas, was sent to England.

HUGHES.—Lt. William Barton Hughes, R.A.F., who w accidentally killed whilst flying on May 17th, was the el son of Professor and Mrs. Alfred Hughes, 29, George Roa Edgbaston. He was 18 years of age.

ENGAGEMENT.

COOK—DISNEY.—The marriage arranged between Ca Charles Cook, R.A.F., and Miss Eveline Disney will take pla (leave permitting) on Saturday, June 8th, at 2.30, at St. Ma garet's, Westminster. Friends will be welcome at the church.

HIGGIN—EARLE.—The marriage arranged between Mr W. W. Higgin, R.A.F., and Miss Olive Earle will take pla quietly on Tuesday, June 11th, at 2 p.m., at St. Nicholas Churc Burton, Cheshire. All friends will be welcome at the church a afterwards at The Old Hall, Puddington.

MARRIAGES.

COPE—SHEPHARD.—On May 15th, at All Saints', Child Hill, Walter Gordon Cope, Capt., R.A.F., only son of Mr. a Mrs. Walter C. Cope, "Castle House," Regent's Park Roa Finchley, was married to Doris Lucy, the third daughter Mr. J. E. Shephard, and of the late Mrs. Shephard, "Weste man," West Heath Drive, Hampstead, by special licence.

GARDNER—FURBER.—On May 18th, at St. John's, Ke sington, Lt. Colin H. Gardner, R.A.F., son of Mr. and Mr W. M. Gardner, of Bradford, was married to Edith Aime youngest daughter of Mr. and Mrs. Furber, of Kensington, t the Rev. A. H. Howe Browne.

WOOD—AMOS.—On the 11th inst., at S. Paul's, Deptfor Capt. Herbert Lee Wood, R.A.F., eldest son of Percy an Mrs. Lee Wood, of Clifton, Manchester, was married to Nor Frances Amos, only daughter of Rev. A. Amos, rector o Deptford, and Mrs. Amos.

BIRTHS.

SCHWANN.—On May 7th, at 33, Lancaster Road, Wimbledo Common, the wife of Brig.-Gen. O. Schwann, R.A.F., of daughter.

SMITH.—On May 13th, at Hartford, Huntingdon, Clare, th wife of Major Sydney Smith, R.A.F.—of a daughter.

YANDELL.—On May 12th, at 45, Gore Park Road, Eas bourne, the wife of Lt. B. Yandell, R.A.F., of a son.

Aeroplane Engine Manufacturers–

You can depend on ALVASTON perfect WELDING.

Pistons, Cylinder Jackets, Intricate Pipe Work, etc., in Steel, Copper, Aluminium, Cast Iron, and Alloys.

Our recently increased Capacity and Twelve Years' Experience are at Your Service.

QUOTATION TO DRAWING OR SAMPLE. PROMPT DELIVERIES.

ALVASTON WELDING CO., ALVASTON, DERBY.

'PHONE—1 ALVASTON. 'GRAMS—"MOTORS, ALVASTON"

Telephones:
Gosport 217.
Southampton 1861.
London: Gerrard 5716

Telegrams:
"Flight, Gosport."
"Flying, Southampton."

GOSPORT AIRCRAFT CO.

HEAD OFFICE: GOSPORT.

AND AT SOUTHAMPTON.

Sir Charles Allom.
Charles E. Nicholson.

London Office: 15, George Street, Hanover Square, W.1.

BLACK ENAMEL.

AEROPLANE GREY PAINT (flat). Oil and Petrol Resisting.

TRANSPARENT WOOD FILLER.

Subject to A.I.D. Inspection.

HARLAND'S

VARNISHES, ENAMELS AND FINE COLOURS.

By Appointment to His Majesty the King.

MERTON, LONDON S.W.19.

ESTABLISHED 1791.

COPAL VARNISHES for AIRSCREWS and EXPOSED WOOD PARTS, &c.

WHITE DOPE RESISTING PAINT.

Subject to A.I.D. Inspection.

R. F. & F. W. BROWN

(F. W. BROWN.)

Wollaton Saw Mills
Near Nottingham

ENGLISH ASH FOR AEROPLANES

Bent Timber Manufacturers.

Telephone . 1526 Nottingham. Telegrams .. Browns, Sawmills, Wollaton.

FOREIGN COMMUNIQUES.

FRANCE.

May 14th.—Army of the Orient.—Allied aviators bombed the depots at Demirhissar and the aviation grounds at Resna. An enemy machine was brought down by British aviators near Livunovo.

May 15th.—Two German aeroplanes were brought down on the 12th and two others on the 14th inst.

During the night of the 14th one of our squadrons bombarded the railway station of Chatelet-sur-Retourne (Ardennes), on which 7,000 kilograms (about seven tons) of projectiles were dropped.

The same night German aeroplanes bombarded the region of Dunkirk. The damage done was of slight importance, and there were no victims.

Army of the Orient.—In spite of unfavourable weather British aviators bombed depots in the region of Seres, and forced two enemy machines to descend, wrecked in their own lines.

May 16th.—On the observation posts of the fortified zone of Paris notifying that enemy aircraft were making for Paris the alarm was sounded at 10.12 p.m. Fire was opened by the artillery posts, and the aircraft assigned to the defence of the city took to the air. No enemy machine succeeded in reaching Paris, but several bombs were dropped in a large suburb. The "All clear" signal was given at 11.55 p.m.

An alarm was given towards midday yesterday in the district north-east of Paris. An enemy aeroplane was making for Paris, but the defence batteries immediately came into action and French aviators went in pursuit of the German, who changed his direction and fled without dropping bombs. The "All clear" was sounded 45 minutes later.

On the 15th, during the day our chasing aeroplanes, favoured by the fine weather, were extremely active. Seventeen German aeroplanes were brought down by our pilots, and an 18th was accounted for by the anti-aircraft defences. In addition, four enemy captive balloons were set on fire.

May 17th.—During the night of May 14th-15th and during the day of May 15th numerous aeroplanes took part in the bombardments of the enemy zone. Thirty-six thousand kilogrammes (about 36 tons) of projectiles were dropped on the railway stations and aviation grounds of St. Quentin, Jassy, Flavy, Le Martel, Nesles, Ham, etc. A dump blew up at Nesles. Fires were observed at Guiscard, Le Chatelet, and Nesles railway station.

On the following night 30,000 kilogrammes of projectiles were dropped on the same region and 10,000 kilogrammes on the regions of Amagne-Lucquy and Montcornet

During the day of May 16th four enemy aeroplanes were brought down and three others seriously damaged.

During the night of May 16th-17th 35,000 kilogrammes of projectiles were dropped on the German railway stations and cantonments in the region of Chaulnes, Roye, Nesles, St. Quentin, etc. The explosion of a dump in the Bois de Champion and fires and explosions at Ecquilly, Villeselve, and Nesle railway station were observed.

Enemy aeroplanes crossed our lines and bombarded several districts at the rear of the front.

Some of the machines proceeded in the direction of Paris. The alarm was given at 10.32, and the "All clear" at 11.2 p.m. Bombs were dropped at various points in the outer suburbs.

Army of the Orient.—British aviators bombarded enemy establishments near Seres and Porna.

May 18th.—Between Lassigny and Noyon two enemy aeroplanes were brought down by our anti-aircraft defences, one during the day of May 16th and the other during the night of May 16th-17th.

May 19th.—On Friday and Saturday our pilots engaged in several fights, in the course of which 12 German aeroplanes and four captive balloons were destroyed.

Twenty-three enemy machines fell seriously damaged in their own lines. In addition three aeroplanes were brought down by our anti-aircraft defences, one by an American battery.

On the same days and on the following night 44,000 kilogrammes (about 44 tons) of projectiles were dropped by our bombarding squadrons on the stations, cantonments, and aerodromes of the enemy zone. Several fires, some explosions, and considerable damage were observed.

Army of the Orient.—To the west of Koritza, between the upper valleys of the Devoli and the Osum, French and Italian troops acting in conjunction carried out with complete success on Wednesday, Thursday, and Friday a series of operations with the object of reducing a very pronounced salient forming the line of position occupied by the enemy in this region and to bring the Allied front into a more advantageous line bounded by the localities of Protopapa-Cerevoda.

In the course of these operations the Air Service contributed brilliantly to their success. Our troops captured a certain number of prisoners. In the centre their advance extended to about 20 kilometres (12½ miles).

May 20th.—Army of the Orient.—The British Air Service successfully bombarded the enemy establishments in the reg of Demirhissar (Struma front).

GERMANY.

May 15th.—Yesterday our aviators shot down five enemy tive balloons.

Nocturnal aerial activity has been very lively on the fight fronts. We have dropped numerous bombs on Calais, Dunk and other rear munition depôts and railway establishments of enemy.

May 16th.—An extensive use of aviators on the fighting fr led to numerous aerial engagements. We shot down 33 en aeroplanes, 14 of which were brought down by the ch squadron formerly led by (the late) Rittmeister Capt. Baron Richthofen. Lieut. Windisch achieved his 20th aerial victory.

May 17th.—Yesterday 18 enemy aeroplanes and one cap balloon were shot down. Lt. Loewenhardt achieved his 2 aerial victory and Lt. Windisch his 21st.

May 19th.—Yesterday 16 enemy aeroplanes and one cap balloon were shot down.

May 20th.—Last night London, and also Dover and ot places on the English coast, were successfully attacked w bombs.

ITALY.

May 14th.—Eleven hostile aeroplanes were brought down in fighting. British aviators bombed successfully enemy hutme near Asiago.

May 15th.—In the early hours of May 14th, Lt. Comdr. Ma Pellegrini, of Vignola, and three men, with rare courage the greatest military and naval skill, penetrated into the strongly fortified military port of Pola. There they repeate fired torpedoes into a large cruiser of the Viribus Unitis type

At dawn our seaplane squadrons arriving in succession o Pola found enemy chasing planes already up. Our pilots brou down two enemy machines and forced another to land. All machines returned safely to their bases.

May 17th.—On May 14th a squadron of our seaplanes bo barded with good results the military works at Lissa Durazzo, causing visible conflagrations. The works at Dura were also bombarded on May 13th with good results by Brit aviators. In spite of anti-aircraft fire all machines retur undamaged to their bases.

During a reconnaissance over Durazzo our aviators establis the fact by means of photographs that the Austrian stean and torpedo-boat torpedoed by us on the night of December 1 are lying on the bottom of the sea and may be considered lost.

May 18th.—Three enemy machines were brought down alo the Middle Piave, two of which within our lines, and the th at Grave di Padadopili.

May 19th.—Aircraft activity was considerable along the wh front. A kite balloon and four enemy machines were broug down, two of them by British aviators.

U. S. A.

May 15th.—Two of our aviators to-day brought down th German machines.

May 19th.—There was reciprocal activity on the part of t aviation service of both sides. Our aviators brought down t enemy machines.

BELGIUM.

May 15th.—Numerous bombs were dropped by enemy aircra on our cantonments. To-day there were bombing duels towar Nieuport and north of Dixmude.

One of our aviators brought down in flames a German ballo towards the Houthulst Forest.

May 16th.—In the course of last night enemy aeroplanes bo barded our cantonments, and an enemy aviator dropped fo bombs on the hospital of Hoogstade.

May 17th.—In addition to the bombardment by enemy aer planes of the hospital at Hoogstaede German airmen during t night of the 15th-16th dropped bombs on the Belgian Hospit at Calais, where a dozen people were killed and twenty injure Several huts were destroyed.

Adjudant Demeulemeester brought down in flames his fir enemy aeroplane above Houthulst Forest.

May 19th.—Lt. Jan Olieslagers brought down his sixth enem machine, which fell in flames above Lake Blankaart. Adjuda Coppens brought down a German balloon in flames. Th aviator has brought down one machine and four balloons in th course of the last three weeks.

TURKEY.

May 13th.—East of the Jordan we repulsed a strong enem reconnoitring patrol. Beyond these actions there was only wea artillery fire and aerial activity.

BULGARIA.

May 15th.—In the valley of the Vardar there was lively aeri activity on the part of the enemy.

CONTRACTORS TO THE ADMIRALTY AND AIR MINISTRY.

SHORT BROTHERS,

ROCHESTER, KENT,

AND

BEDFORD.

Telephone —
627 CHATHAM
261 AND 262 BEDFORD.
788 BATTERSEA.

Telegraphic Addresses;
"SEAPLANES," ROCHESTER
"SHORTS," BEDFORD.
"BALLOONING," LONDON.

London Office: WHITEHALL HOUSE, 29/30, CHARING CROSS, S.W. 1.
Telephone 378 REGENT. *Telegrames*; "TESTED, PHONE, LONDON."

THE MIDLAND MOTOR CYLINDER Co. LTD.
SMETHWICK Nr. BIRMINGHAM
TELEPHONE—289 SMETHWICK TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

OFFICIAL ACCEPTANCE TESTS

LAND MACHINES.

S.P.A.D.	*Avro*
Sopwith	*Armstrong-Whitworth*
B.E.	*D. H. 4.*
Short	*Handley-Page*
Curtiss	*Bristol*
Mann, Egerton	*Vickers*
M. Farman	*Nieuport*
H. Farman	*Supermarine, &c.*
Morane	

SEAPLANES.

Short, Sopwith, America Boats, F.B.A. Boats, Curtiss Boats, Norman-Thompson, A. D. Boats, &c.

Private Aerodromes Surveyed and Pilots' Reports Furnished.

DELIVERY AND EXPERIMENTAL FLIGHTS
ON LAND MACHINES & SEAPLANES.

COMPLETE REPORTS FURNISHED.

Rates on application to
THE
PRODGER - ISAAC
AVIATION COMPANY
(C. B. Prodger and Bernard Isaac),
166, Piccadilly, London, W.1.

Telephone: *Gerrard* **278** (2 lines.)
Telegrams: "Aeromnia, *Piccy, London.*"

CLIFFORD B. PRODGER
J. LANKESTER-PARKER,
and other Pilots.
Approved Admiralty Pilots
— for Acceptance Trials. —

INSURANCE.

WE are now in a position to quote low rates, through our brokers at Lloyd's, for the Insurance of Aircraft during ACCEPTANCE TRIALS AND DELIVERY FLIGHTS with an excellent and most comprehensive Policy. May we quote you for your new contracts?

CIAL ARRANGEMENTS with Sub-Contractors for HANDLEY-PAGE Type Land Machines or "AMERICA" Type Flying Boats

THE WAR IN REVIEW.

On the Western Front.

"Excelsior," Paris, May 8th, in reviewing the aviation work of the Allies for the month of April, remarks that this period was not more fortunate for the Germans than the first days of their offensive. April clearly confirmed the superiority of the Allies' aviation squadrons. French aviators brought down 63 enemy planes and eleven observation balloons, and forced 57 damaged aeroplanes to come down. American aviation has shown itself worthy of emulation by the Allies, and counts 14 victories.

The French Aces.

It is reported that Capt. Pinsart has scored his eighteenth victory by bringing down a German "Drachen," Lt. Hugues has brought down his twelfth enemy machine, Lt. de Slade and the American Serjeant Baylies their seventh each, and Serjeant Gerard, a pupil of Lt. Nungesser, his fifth.

A Variety of Experiences.

The "Times" correspondent with General Headquarters writes on May 7th as follows:—

One of our pilots had a thrilling experience a few days ago, when, falling in with an enemy patrol of 12 machines, he pluckily attacked the rearmost enemy, which was flying at the greatest height above and behind the others. The German dipped to avoid him, but he followed, and, firing into it at short range, sent it down, and saw it fall out of control to within 1,000 feet of the ground. Meanwhile six enemy machines turned on our man, who put his aeroplane into a spin, and went whirling down through the rest of the German formation, chased and fired at as he went. His control was shot away, and his machine plunged helplessly to within 100 feet of the earth, when it miraculously flattened out of its own accord so suddenly that it broke its own back, and snapped the fuselage in two immediately under the pilot's seat.

Seeing that the crash was coming the pilot had loosened his belt, and was jerked clear of the machine, to reach the ground unhurt. The enemy machines following saw that he was safe, and, swooping down, opened on him with machine-guns on the ground, and, as each came by, some within a distance of 30 feet, he answered with his revolver. Happily, the unequal duel was interrupted by some neighbouring British infantry, who started firing on the enemy with rifles and machine-guns, and made it so hot for them that they drew off, and left our man unhurt, after as dizzying an experience as man could well go through.

Interned in Holland.

A German biplane landed in Holland, near Uithuizen, in the province of Groningen, on May 11th. The two occupants have been interned.

A German naval lieutenant and a sailor were found on a sinking seaplane on May 11th by a Dutch lugger, six miles north-east of the Haaks lightship, and have been interned.

Exceeding the Mark.

Chelmsford's aeroplane week, held to raise £50,000 for the purchase of 20 aeroplanes, closed on May 11th, with a total of £86,830.

Frightfulness versus Frightfulness.

According to the "Telegraaf's" (Amsterdam, May 15th) frontier correspondent, bombs were recently dropped on the casino at Menin, and wrought havoc among a German band which was practising, few escaping alive.

Interned in Denmark.

It is reported that a German aeroplane landed near Kolding, Denmark, on May 16th, owing to engine disorder. The two aviators set their machine on fire.

A Peaceful Politician.

According to the "Kölnische Zeitung" and the "Rheinisch-Westfälische Zeitung," on April 23rd, in the Main Committee of the Reichstag,

Herr Mueller (Progressive) asked whether an agreement was not possible to preserve open towns behind the front from aerial attacks.

Von Stein, in reply to questions, said:—"So long as no proposal has been received from an enemy Government to restrict aerial attacks to fortified towns, we cannot undertake such an obligation alone."

An Allegation and a Denial.

The following statement was included in the official German Wireless news on April 24th:—

From papers found on American aviators who were shot down it has been proved that for their own sa many of them crossed over on hospital ships certified as m bers of the American Ambulance Service in France.

The Secretary of the Admiralty makes the following st ment:—

No hospital ship, British or American, has ever carried anyt but invalids and the necessary medical staff. Further, there no hospital ships working the cross-Channel route; the w statement is therefore a fabrication.

The American naval and military authorities state that have some few aviators who were in the Allied Ambulance vice in France before the United States came into the war; even in such cases these men crossed the Atlantic in the ordi ships taking their full chance of being torpedoed.

Brazilian Military Aeroplanes.

A message from Rio de Janeiro, dated April 20th, states authority has been received to build a large establishment for construction of war aeroplanes.

When the Cat's Away.

The "Morning Post" correspondent writes from the Bri Front on May 3rd as follows:—

One unusual feature of the fighting was the heavy att from the air. German aeroplanes attacked the French fro height of only 30 feet around Kemmel, and, taking their from our aviators, made daring assaults in mass formation. one time nearly 80 German aeroplanes were dropping bo and firing their machine-guns against a front held by French battalions.

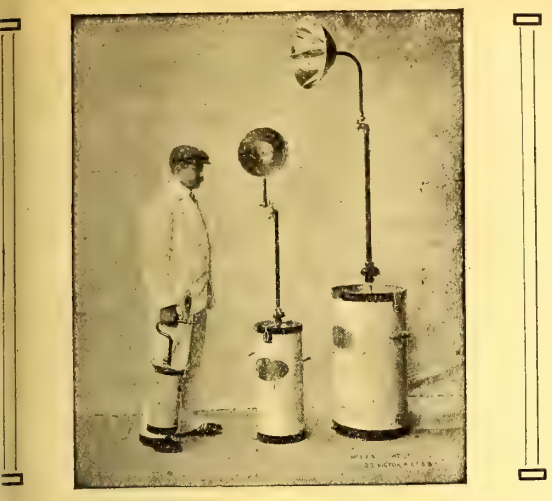
[Presumably the local R.A.F. were busy elsewhere.—Ed.]

The Old Story.

A Berlin telegram to the "Rheinisch-Westfälische Zeitur states on May 3rd that the Government representative, repl in the Reichstag to further questions from three Dept regarding aerial raids, said:—"The question how enemy attacks on open towns outside the war zone can be preve has been repeatedly and thoroughly examined by all the dep



THE DAYS THAT WERE—AND OUGHT TO BE.—Some R.N.A.S. Officers and their dogs. Apparently, it was the custom for the size of the dog to be in the inverse ratio of the rank of the owner.



Large numbers of these three types have been supplied.

MPERIAL LIGHTS
—FOR—
ERODROME LIGHTING

MPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

grams—
3DIBRAC,
PHONE,
LONDON.'

Telephone—
VICTORIA
3540
(3 Lines)

Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd.

The Linen Hall, Regent Street, London, W.

mall
id
ge
ne
les,
in
and
llon
ms.

MPT
VERY
INST
A"
TIFI-
TE.



FIRST IN 1880 FOREMOST EVER SINCE.

The quickest drying and hardest Enamel manufactured.

SE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

LICO ENAMEL CO.,
NEW CROSS, LONDON, S.E.

Glue-pots
ELECTRICALLY HEATED.

Others are largely using these

—including the leading Aeroplane Factories, Munition Works, Woodworking Firms, Pattern Shops, Dockyards, Railways, Engineers, &c.

We undertake to promptly equip your works completely with every requirement in

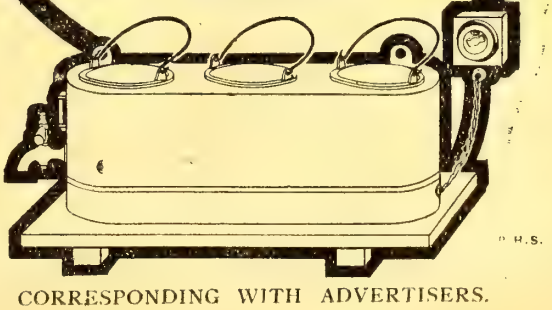
Single, Double or Triple

Electrically-heated Glue-pots. Cast-iron Vessels, Solid Copper Water Bath, with Water Level Gauge.

The Regulating Switch permits the heat being applied and maintained at High, Medium or Low Temperatures as required. Made in all sizes.

Ask us to quote you for your needs.

PREMIER ELECTRIC HEATERS, Ltd.,
258-260, BRADFORD STREET, BIRMINGHAM.



ments concerned. There are no absolutely certain means for warding off aerial attacks. The best means is a good anti-aircraft defence; then the threat of reprisal flights against enemy capitals. The Army authorities are making endeavours in both directions.

[Which is precisely what General Brancker said two years or so ago.—Ed.]

After referring to Paris, the Government representative added that if definite proposals were received the military authorities would consider them.

Healthy Optimism.

General Malaterre, at a banquet given at the Aéro Club in Paris in honour of the French aviators who have escaped from Germany, said—"French aviation, having won definite supremacy, will henceforth play an efficacious strategic rôle in the war, and should even lead us to the left bank of the Rhine."

Dutch Yarns.

The "Les Nouvelles" (Amsterdam, May 3rd) learns from a reliable source at The Hague that Allied aviators recently succeeded in sinking in a single day 23 Belgian boats laden with gravel and road metal destined for the German front in Picardy. The vessels were then seven or eight miles from the enemy rear lines.

"Three weeks ago," the journal adds, "the Luxemburg bridge at Namur was again badly damaged by aircraft. Two of its arches were destroyed, one boat was sunk, and three German soldiers on sentry duty on the bridge were killed.

The movement of vessels to the front has never been so intense as since the opening of the German offensive, and never have the destruction and devastation wrought by the Allied aviators been so great. The roads have been so cut up that the Germans experience great difficulty in bringing up gravel and stones in sufficient quantities to fill up the craters.

The Death of a Noted Austrian Pilot.

It is reported that Austria's most successful aviator, Lt. von Hillier Schönaich, has been killed on the Italian front.

Small Game.

It is reported that five Dutchmen, the crew of a small sailing vessel of about 100 tons, have been landed at a British port after escaping from an attack by four German seaplanes.

About 40 miles off the coast of Holland the aviators, who were without bombs, circled round the little vessel for nearly two hours, maintaining an incessant fire upon it with their machine-guns.

The crew when ordered to leave their boat took to the dinghy, and the wind took them towards the English coast. They were fortunate enough to be picked up by a small British craft, after pulling in a rough sea for hours and covering a distance of 60 to 70 miles.

On May 3rd the abandoned vessel was brought into the same harbour, having been found derelict in the North Sea by a British destroyer. It was literally covered with machine-gun bullet holes.

Cutting Off the Current.

The "Times" special correspondent at Italian Headquarters writes on May 5th, as follows:—

Italian and British airmen yesterday flew to Cavedine, north-east of Riva (Trentino), and dropped such a weight of explosives on the great water-power electricity station there that it will be some time before it can again supply a considerable amount of current.

The central power house was seen to be destroyed. The raiders flew in four rotating groups, one being British. The attack lasted from 8 a.m. till mid-day.

An important effect of the raid will be the stopping of the electric railway from Trent, up the Val di Sole, to Fucine, which is an important link in the Austrian Army's communication (for the Adamello sector).

The Zeebrugge Blockage.

It is reported by Reuter that the latest photographic and other evidence from Zeebrugge shows that the canal is still wholly blocked and is quite unusable.

The block ships are found to have been even better placed than was at first believed, and in consequence of British air activity and other causes the attempts to effect a clearance are meeting with no success.

For Nobler Sport.

It is reported that Capt. Mouronval and Capt. de France, commanding French Air Squadrons at the front, and who are both well-known football players, have been awarded the Legi of Honour.

The Bombardment of Cattaro.

A Reuter's message from Amsterdam stated that a Vien telegram says that six aeroplanes bombed the Gulf of Catta naval base on the afternoon of May 11th, but claims that no lo or material damage was caused. One machine fell, and occupants were captured uninjured.

A Paris Warning.

A Reuter's message from Paris, dated May 15th, states th an air-raid alarm was given here at 10 minutes past 10 th evening.

When Ace Meets Ace.

On May 14th M. Clemenceau personally congratulated th well-known "Ace," Lt. Fonck, on his feat in bringing dow six enemy machines within two hours.

The American Aircraft Scandals.

A Reuter's message from Washington, dated May 15th, stat that President Wilson has sent a letter to Mr. Martin, th Senate Democratic leader, opposing the extension of the aircra inquiry into a general investigation of war activities, as provided by the resolution now before Congress. Mr. Wils said he would consider the passage of a direct vote as one want of confidence in the Administration, and as an atten by Congress to take over the conduct of the war.

Judge Hughes has consented to assist the Attorney-General conducting the aircraft inquiry. The Senate has agreed to it, b prohibited the general war investigation objected to by M Wilson.

Air Diplomacy.

A Reuter's message from Rome on May 1st states that as t result of an agreement recently arrived at between the Briti and Italian Governments, it has been decided to establish t post of Air Attaché with the respective Embassies in Lond and Rome.

The new Italian Attaché, like his Military and Naval co leagues, will represent Italy with the British Government in questions concerning aeronautic organisation. The first occ pant of the newly-created post is Commandant Teodoro I Bonis.

"HOW AN AEROPLANE IS BUILT."

That excellent little book by Mr. Stepney Blakeney, "Ho An Aeroplane is Built," is already becoming popular amo many classes of people. Those engaged in aircraft work w want to know what part their products play in an aeroplan those who are learning to fly and want to know how the mounts are produced, those who hope some day to build aer planes themselves, are all acquiring the book.

It is entertainingly written, not in the least scientific, and c be thoroughly understood by anyone who is capable of takin a bicycle to pieces and putting it together again. Draughtsme newcomers to aeroplane works, pupils at aerodromes, intellige schoolboys, and so forth, will find it most useful, as will tho who possess workshops in other lines of business and are no taking on contracts for aircraft parts.

The book may be had for 5s. 4d. post free from Th Aeroplane & General Publishing Co., Ltd., 2, Breams Building E.C.4.

"THE AEROPLANE SPEAKS."

Quite one of the most successful books of modern times h been "The Aeroplane Speaks" by Capt. H. C. Barber, R.F.C Both in this country and in America it has been adopted u officially as the manual of instruction for beginners in practic aeroplane work, and consequently the demand for it has bee enormous, though by no means surprising when one conside the book on its merits.

As the result of this demand it has been necessary to produc a Sixth Edition of the book, and the publishers have bee fortunate in finding a sufficient supply of paper to make this goo work possible. The book has been revised and brought up t date, and it now contains, in addition to previous illustration plates of Allied and enemy machines in use down to the prese year.

"The Aeroplane Speaks" may be had, as usual, from Th Aeroplane & General Publishing Co., Ltd, 2, Breams Building E.C.4, at 8s. post free.

PRESS-WORK and SPINNINGS
and Sheet Metal (War) Work generally.
The LONDON ALUMINIUM Co., Ltd., Aircraft Dept., Westwood Road, Aston, B'ham. 'Phone: EAST 497.

Von Richthofen's Own Story.

2/6 net. Post free, **2/9**

ILLUSTRATED.

The Red Air Fighter.

BY

CAPTAIN BARON VON RICHTHOFEN.

Von Richthofen's biography, in which he describes his experiences in the war and his air victories, has been translated and annotated for the special benefit of the Flying Services.

It would in any case have been read with profit and interest, but his death at the end of April has made the translation more than ever opportune. Copies of the book will be supplied strictly in rotation of orders received.

Now Ready. **5s. net, 5s. 4d. post free.**

Fully Illustrated with Diagrams.

HOW AN AEROPLANE IS BUILT.

By STEPNEY BLAKENEY.

With an Introduction by C. G. Grey.

*** This book contains the articles which appeared in the "Aeroplane" under the title "Construction of Aeroplanes and their Components." They have been thoroughly revised, and are reprinted in response to many requests.

Now Ready. **1s. 6d. net, 1s. 8d. post free.**

THE "AEROPLANE" BLUE BOOK.

A DIRECTORY OF AIRCRAFT FINANCE, 1918.

A handy, up-to-date and authoritative reference book on all matters affecting the Directorate, Capital, Accounts, etc., of Aircraft and Kindred Companies.

The "Aeroplane" & General Publishing Co., Ltd.,
2, Breams Buildings, E.C.

MOSS-
AERO-ENGINE GEARING



Manufactured on principles ensuring greatest

STRENGTH AND **ACCURACY.**

GEARING—FLYWHEELS—CAMSHAFTS

R.A.F. PROPELLER BOSSES.

Our Aero parts are made in specially **HIGH TENSILE STEEL**, heat treated and all parts corrected for distortion.

TRANSPORT, LORRY & PLEASURE CAR GEARING

Bevel and Worm Drives accurately generated. Steering Worms and Sectors. Spur and Bevel Differentials. Gear Box Gears. Camshafts with guaranteed Glass-hard Cam Profiles.

-GEARING

THE MOSS GEAR CO., LTD.,

W DUCKITT *Managing Director.* ***Thomas St., Aston, BIRMINGHAM***

THE

BRITISH WRIGHT

CO. LTD.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

Manufacturers of

AERONAUTICAL INSTRUMENTS

FOR

NAVY & ARMY AEROPLANES

Ogilvie Air Speed Indicators

For use on Aeroplanes, Airships, Kite Balloons and Air Stations.

Statoscopes.

Recording Manometers.

Wind Speed Recorders.

At present the Government is taking the entire output, but British and Foreign Firms are invited to place their orders now for delivery of Aeronautical Instruments after the war.

The BRITISH WRIGHT Co. Ltd.

33, CHANCERY LANE, LONDON, W.C.2.

Contractors to H.M. Government.

SWIFT

AVIATION CO.

Engine Plates in Stock, Complete Sets.

Speciality Sopwith Spares.

KINGSTON

PHONE—
762 KINGSTON

'GRAMS—
"SWIFT, KINGSTON"

HEATING AND VENTILATION

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

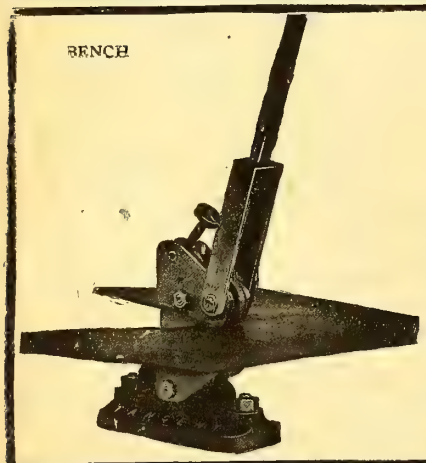
Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. Wire: "KINNELL-BOROH-LONDON."

CHAS. P. KINNELL & Co., Ltd., SOUTHWARK ST., LONDON, S.E.1

BENCH



TANGENT

SHEET METAL SHEARING

APPLIANCES

PATENT

Self - Feeding. Fast - Cutting.

Blocks illustrate a combined portable and bench tool for sheets up to 3/32" steel, and 1/8" softer metals. Other types also made, including portable hand tools for Corrugated Iron.

WRITE FOR DESCRIPTIVE PAMPHLET

MONTGOMERY, SMITH & CO. LTD.

Patentees and Manufacturers,

KEYNSHAM, SOMERSET.



PORTABLE

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,

51, 52, 53, PARK STREET, BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

"NOVELLON" DOPE

AND AEROPLANE VARNISH.

CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED.

Telegrams: Cellutate. London.

8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4045.*

Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.

(Telephone: Willesden 2380.)

The LARGEST and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE AIR SERVICES
Particulars from BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.

THE SIBERIAN & GENERAL TRADING CO., LTD.
Can supply from stock or for prompt shipment
PLYWOOD
IN ALL WOODS, SIZES AND THICKNESSES.
SPECIALITY: BOARDS FOR AIRCRAFT WORK.
HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

Telephone—Works: East 3832, 3833. Offices: 3474 Gerrard. Telegraphic Address—"Extouboul, London."
THE STANDARD Aircraft Manufacturing Co., Ltd.
CONTRACTORS TO H.M. ADMIRALTY AND AIR BOARD.
Head Office: SAVOY HOUSE, Corner of Savoy Street, STRAND. W.C.2.
Also at 28, BOW COMMON LANE, LONDON. E.3.

THE "BOWSER" AEROPLANE SEATS
(Made to A.G.S. Drawing 264).
Supplied to the Royal Aircraft Factory and the Leading Aircraft Manufacturers.
EDWARD BOWSER, 50, Park Lane, Leeds. Tel. No.: Central 3473.
Under the A.I.D. Inspection.
Northern Representative—
Mr. WALTER M. DANIELL,
33, East Beach, Lytham.

EBORA PROPELLER Company, 11 & 12 Surbiton Park Terrace, KINGSTON on Thames. Telephone KINGSTON 672. Telegrams EBORA, KINGSTON.
Ebora Propellers
Contractors to the Admiralty and War Office
SCHOOL PROPELLERS
FOUR BLADERS
SEAPLANE PROPELLERS
SLATE TABLES For PROPELLER WORKS

Lang Propeller LTD.
Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.



Turning, Milling, Drilling, Grinding TO FINE LIMITS

IN ALL METALS

For Aircraft and Engines.

BLUMFIELD, LTD.,

70, LOWER ESSEX ST., BIRMINGHAM.

NO HASTY PROMISES, BUT PUNCTUAL DELIVERIES.

V.G.R.

DO YOU NEED ASSISTANCE?

If so, let us quote you for

WOOD AND METAL PARTS AND UNITS Covering and Doping.

WORK GUARANTEED.

THE **BURTON AIRCRAFT & MANUFACTURING Co. Ltd**

PARK STREET, BURTON-ON-TRENT.

Phone-554 Burton-on-Trent. Telegrams-"Planes, Burton-on-Trent"

The Air Navigation Co., Ltd.

BLERIOT & SPAD,

ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director,

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

Manufacturers of **PHOSPHOR BRONZE, GUN METAL,**

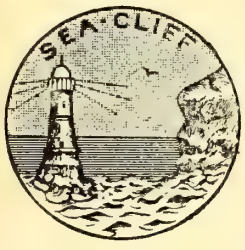
MANGANESE BRONZE,

BRASS & COPPER,

TUBES, SHEETS, RODS, WIRE, AND

CASTINGS.

PHOSPHOR TIN, PHOSPHOR COPPER.



CHARLES CLIFFORD & SON, LTD.,

BIRMINGHAM.

NOTICE TO AEROPLANE WORKS.

SUPPLIES OF 'CROID' LIQUID GLUE.

The necessary additional plant having been obtained, the output of "CROID" Liquid Glue for Aircraft Construction, etc., has now been largely increased, and delays in the despatch of supplies will not, it is anticipated, arise from shortage, as has lately been the case.

THE IMPROVED LIQUID GLUES COMPANY, LTD

Great Hermitage Street and Bushell Street, London, E.1.

Telephone: Avenue 3178. elegrams: Exeroiden, 'Phone. London.

SALMSON AERO-ENGINES

(Canton-Unné System).

All enquiries should be addressed to

THE DUDBRIDGE IRON WORKS, Ld.

STROUD,

GLOUCESTERSHIRE.

London Office:
87, Victoria Street, S.W.1,

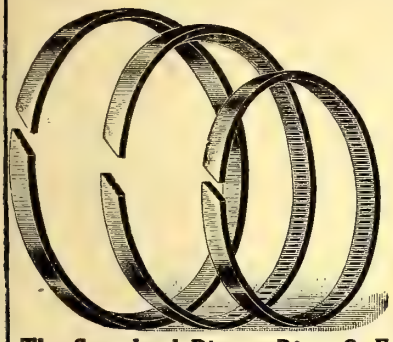
STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK

J. B. GUTHRIE & SON
(JOHN J. GUTHRIE)

30, ST. MARY AXE, LONDON

TELEGRAMS—BUSIRIS LED, LONDON. E.C.3.
TELEPHONE—AVENUE 1432.

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process.
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.

Telephone No. 2149.
Telegrams—
"Ocean" Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Don Road Sheffield.

Aeroplane Steel Sheets

as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers

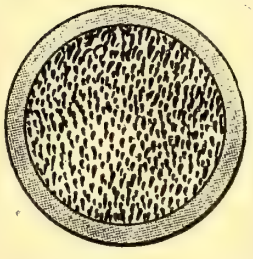
Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

SMETHWICK, BIRMINGHAM

Telegraphic Address: "Bernico," Birmingham
Telephone No.: 224 Smethwick

ANTOL CASE HARD



Harden your Screws and Gauges with **ANTOL.**
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1

"FREMO" TAPER PINS

Why not allow us to carry all the responsibility which rests, and must rest, upon the taper pin?

We have given our product a name in order that we may do so. It is our way of proving the confidence we have in that which we made.

FRED^K. MOUNTFORD (B'ham.) Ltd.
Lifford,
BIRMINGHAM.

THE POOLE AVIATION CO
POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines

ENQUIRIES INVITED.

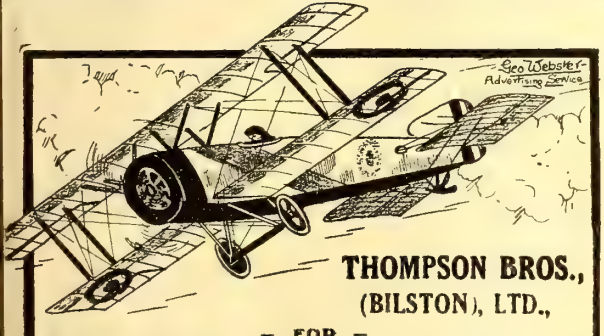
'Phone: Poole 54. 'Grams: Aviation, Poole

NOTICE!
Important to Aircraft Firms.

MANUFACTURER with every facility for expansion requires steady supply of orders for Metal Fittings (press and hand made). Samples of Parts already produced sent on receipt of card.

WILLIAM MILLER, Maker of Metal Aero Fittings, Tools, Dies, Stampings, Time Checks, Labels, Marking Punches, Stencils, Military Ornament, Works' Badges, Enamels, etc.,

21, HYLTON STREET, BIRMINGHAM.
'Phone: CENTRAL 1240.
Branch: 13½, Gt. Hampton St., Birmingham



THOMPSON BROS.,
(BILSTON), LTD.,
— FOR —
UNDERCARRIAGES
TUBULAR FRAMEWORK
AERO. DEPT. BILSTON, Staffs.



TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 5912. E. H. Godbold, Director
GODBOLDS

AEROPLANE STAMPINGS
IN 3 PLYWOOD.
Perfect cutting. Sample posted free.
SMALL PARTS UP TO 12 ins. by 4 ins.
A. W. ROSS, 20, HERTFORD RD., KINGSLAND RD., LONDON, N1.

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

Clegg Metal Engraving Co.
Chatsworth Works, Worthing,
For Dials, Scales, Name-plates and Address Plates, and Instruction Plates, in Metal, Ivorine, Etc.
Either Chemically Engraved or Machined.

ALWIN ENGINEERING CO., AERONAUTICAL ENGINEERS,
A. E. CARTLIDGE. LUTHER ROAD, TEDDINGTON, S.W.
Tel. No. Kingston 2412.
TRADE MARK ALWIN
Makers of all kinds of Aircraft Fittings.
Presswork a Speciality,
Pressings for DeH, etc.
Avro, Sopwith, Fairey and many other types.
On receipt of Post Card our Representative will call and give immediate quotation.

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work. Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

Clean Coloured Rags
FOR CLEANING & WIPING.
Best and Cheapest for Munition Works :: Engineers, Printers & Bus Companies, etc.
A. JOSEPH, EARL STREET, LONDON ROAD, LONDON, S.E. 1.
Telephones: Hop 83, 361 & 4272. "Cheaper than cotton waste."

BRAZING AND SILVER :: :: SOLDERING.
J. W. KING,
36, ST. JOHN'S SQ.
LONDON,
E.C. 1.
TELEPHONE - - CITY 5238.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Constructors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING
RUSSELL BROTHERS, Ltd., REDDITCH
MACHINES.

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

CIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS, In these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per line For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1

PATENTS.

E & ROWLINGSON, Chartered Patent ts (Consulting Engineer, Mr. S. E. , A.M.Inst.C.E.), 27, Chancery Lane, on, W.C. Tel. 332 Central.

y Skerrett (H. N. Skerrett, A.I.A.E., Tech.E., Associate I.E.E., Fellow of the tered Institute of Patent Agents) Patents, ns and trade marks.—24, Temple Row, ingham.

itors advised free. Write for booklet.— 's Patent Agency, Ltd., 165, Queen ria Street, London. 30 years' references.

ey, Popplewell and Co., Patent Agents Consulting Engineers. Applications for its attended to in all countries.—38, cery Lane, W.C. Telephone: 1763 Cen- Circular free.

SITUATIONS VACANT.

Superintendent wanted for large aircraft y in Yorkshire. While some knowledge rcraft construction is essential, discipline rganising power are even more impor- No person already engaged on Govern- work will be appointed.—Reply, giving experience, and salary required, to your st Employment Exchange, mentioning aper and No. 3580.

ble and experienced draughtsman wanted g and tool design on high-class repeti- work, near London. No person already overnment work will be engaged.— , stating age, experience, and salary re- d, to your nearest Employment Exchange oning this paper and No. A.5160.

ienced Aircraft Fitters, Tool and Jig rs, Plane Erectors, required at once. No n engaged on Government work or resi- more than 10 miles away need apply.— particulars to Worms Aircraft Construc- o., Ltd., Bournemouth.

ed at once for work on Handley Page nes in aircraft factory, London, N.W., a er of aeroplane erectors and assemblers; e nacelle assemblers, and viewers on final on. There are also vacancies for sheet workers for petrol tanks and cowling, smith for pipe work, and panel beaters. district rate and war bonus paid in all No one on Government work or living than 10 miles away will be engaged.— , Box No. 3556, THE AEROPLANE, 166, illy, W.1.

ial Inspector required for large aeroplane Manchester district; practical experience gineering and general stores materials ial; knowledge of aircraft materials an tage. Good prospects for a capable and tic man. No one on Government work e engaged.—Applications must be made h your nearest Employment Exchange, oning this paper and No. 3566.

Draughtsmen required, accustomed to aircraft and machine tool work (2 each). Good residing more than 10 miles away need apply. —Box No. 3618, THE AEROPLANE, 166, Piccadilly and prospects offered to the right men. No one engaged on Government work or dilly, W.1.

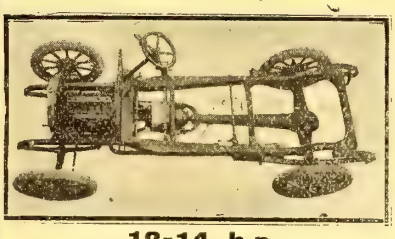
Metal Fitters (50) and **Toolmakers** wanted immediately, small parts, Government work. No one on Government work or residing more than 10 miles away need apply.—Mr. Knowles, Sage's Works, Baldwin's Gardens, Gray's Inn Road, W.C.1.

FOREMEN
and PRODUCTION
MANAGERS
REQUIRED

to inaugurate departments at our new works. Good opportunity for men with knowledge of sheet metal working in all its branches. Must have initiative and be used to dealing with Trade Union labour. Preference given to men who have been used to aeroplane sheet metal work or similar occupations. No one residing more than 10 miles away or already engaged on Government work need apply.

Apply—L. T. DELANEY, *Managing Director*,
GALLAY RADIATOR CO., LTD.
198, Gt. Portland Street, W.1.

PALMER'S GARAGE & TOOTING ENGINEERING WORKS,



12-14 h.p.
FIAT CHASSIS FOR NATIONAL SERVICE.
PRICES, with new tyres:—
3-speed model, **£125** 4-speed model **£150**
IMMEDIATE DELIVERY.
These chassis are the best value obtainable and run 25-30 miles per gallon of petrol
Write for Catalogue of Fortnightly Auction and for details of my F.I.A.T. Secondhand Cars, Landaulets, Vans, Lorries, 2 and 4 Seaters, etc.
AUCTION SALE EVERY FORTNIGHT.
Entries invited.
Next Sale, THURSDAY, 6 June, at 2 o'clock.
Catalogues sent free on application.
PALMER'S GARAGE, TOOTING.
'Phone: 208 Streatham.
CARS BOUGHT FOR CASH.

Woodworkers Wanted for small aircraft parts. N.W. London. Controlled establishment. No person residing more than 10 miles away or engaged on Government work need apply. —Box No. 3616, THE AEROPLANE, 166, Piccadilly, W.1.

An Engineering Firm in South London, engaged on aeroplane metal spares, requires an engineer for estimating, costing, and progress work. Good salary will be paid to capable man. No one already engaged on Government work or residing more than 10 miles away will be considered.—Apply, stating age, experience, and salary required, to Box No. 3579, THE AEROPLANE, 166, Piccadilly, W.1.

Plane Assemblers wanted, immediate D.H. experience if possible. Fare paid. Flat rate and good shop bonus given. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3610.

Aero Engine Fitters required, must be used to overhauling Gnome engines. Good wages paid. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3609, THE AEROPLANE, 166, Piccadilly, W.1.

Sheet Metal Workers and Panel Beaters for Aeroplane Work. Best rates paid. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3615, THE AEROPLANE, 165, Piccadilly, W.1.

Draughtsmen, Senior and Junior, required at once. Preferably accustomed to aero engine work; also experienced Lady Tracer. No one engaged on Government work or residing more than 10 miles away will be engaged.— Box No. 3598, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Young Man, experienced departmental manager, capable of organising for output, requires a similar situation.—Box No. 3617, THE AEROPLANE, 166, Piccadilly, W.1.

Buyer seeks re-engagement, 3½ years' aircraft experience, thorough knowledge of materials, accessories and markets. Energetic and methodical. London district preferred.—Box No. 3614, THE AEROPLANE, 166, Piccadilly, W.1.

Smart Man requires post as Woodworking Foreman. Up-to-date methods, good and capable organiser, expert in rapid production and the economical use of timber. Excellent references.—Box No. 3613, THE AEROPLANE, 166, Piccadilly, W.1.

Experienced Mechanical Draughtsman requires position with aircraft or engine firm, not necessarily in drawing office.—Apply Box No. 3612, THE AEROPLANE, 166, Piccadilly, W.1.

FINANCE.

Late Managing Director of well-known Aeroplane Company is desirous of taking a financial and active interest or purchasing outright Aircraft Manufacturing business.— Box No. 3608, THE AEROPLANE, 166, Piccadilly, W.1.

TO LET.

Convenient Workshop to Let in Western District, to accommodate 30-35 workers, fitted with electric power and light, also gas. Good benches.—Apply Box No. 3619, THE AEROPLANE, 166, Piccadilly, W.1.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1.

Engineering Firm with well-equipped machine shops, now engaged on munitions, solicits inquiries for all classes of turning, drilling, grinding, milling, fitting, etc. Aircraft fittings, also copper pipe work, a speciality. Correspondence with a view to post-war business especially invited.—The Lankester Engineering Co., 39, Eden Street, Kingston-on-Thames.

Wanted Contract for machine work to suit 8in. screw cutting lathes. Class A work only.—F. Burnerd & Co., Toolmakers and Machinists, Dryburgh Works, Dryburgh Road, Putney, S.W.15. 'Phone, Putney 1284.

Polishing Plant shortly available for large contracts. Aircraft work a speciality. Inquiries solicted at once.—Write Box No. 3611, The Aeroplane, 166, Piccadilly, W.1.

HAULAGE.

Steam and Petrol Motor Wagons for Hire, for timber transport.—Apply, Silwood Storage Co., Ltd., 7, Victoria Street, Westminster, S.W. Telephone, Victoria 6882.

MISCELLANEOUS.

MAKE MONEY BY WRITING.

£50 PRIZE. Send postage (2d.) for particulars and copy of "How to Earn Money while Learning How to write for Newspapers and Magazines." Practical and Comprehensive Correspondence Courses—Fiction and Articles, etc. Expert Literary Directors. Constructive Criticism. Beginners taught how to make work saleable. Exceptional testimonials. Address "Editorial" (Dept. A), 22, Chancery Lane, London, W.C.2.

Luminous paint for wrist watches, clocks, match boxes, etc.; remains luminous for years. Bottles 1/9 and 2/9.—Tobin & Co., 39, Charles Street, Hatton Garden, E.C.

ENGINES WANTED AND FOR SALE.

For Disposal.—Two No. 617 120 h.p. 10 cylinder, Anzani engines. Revs., 1150/1200, complete with collector type exhaust pipes, magneto, zenith carburetter, etc. One engine runs clockwise, the other counter clockwise. In first-class condition, used for experimental purposes only.—Apply, Box No. 3606, The Aeroplane, 166, Piccadilly, W.1.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road, Manchester.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page II. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264, or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester.

Cane Seats Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

FOR SALE.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid.—Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Tarpaulins.—New waterproof khaki sheets for sale. Also second-hand railway truck sheets, repaired and redressed. London works.—For prices, etc., write Johnston, 12, Broughton Road, Croydon.

30-h.p. 6 cyl. Delaunay Belleville chassis.—In reply to numerous inquiries we beg to say this chassis was sold immediately on appearance of our advertisements. No other chassis of this type will be available until normal conditions are resumed. We trust our numerous inquirers will accept this intimation as, owing to shortage of staff, we are unable to reply to each individually.—Delaunay Belleville Automobiles (England), Ltd., Carlton Vale, Maida Vale, N.W.6.

MODELS.

T. W. K. Clarke and Co., Ltd., Model Department, Hampton Wick.—Though we are full up with full-size aeroplane parts we still build models as we did in 1906. We with Biplanes, etc., in Stock.—Send 3 for our illustrated List, 120 items in models; certain metal goods are out of

Model Aeroplane, flies ½ mile circular carriage paid, 3s. 6d. "I can thor recommend your machines." Testi from Dr. Adams, Union Road, St Thousands satisfied, testimonials fro parts.—Dept. C., Bristol Model Ae Depôt, Eastville, Bristol.

First-class ½-h.p. Model Aero Motors, c or tooled. See list of same, two sta Littleover Aerials, Derby.

PUBLICATIONS.

6th Revised and Enlarged Editi with "Types of Aeroplanes" down t

THE AEROPLANE SPEAKS

By Capt. H. Barber, A.F.Ae

Price, 7s. 6d. net.; 8s. post free

McBride Nast & Co., 2, Breams Bu E.C.

BOOKS

By Lieut. Victor W. Page of the U.S. Air

JUST PUBLISHED.

AVIATION ENGINES. Their Design, C tion, Operation, and Repair. A book for the Engineer, and all interested in Aviation, by ised authority. Giving practical instruction and maintenance not to be found el Medium 8vo. 580 pages, with over 240 tinctive and specially made Engravings. Price

GLOSSARY OF AVIATION TER English-French and French-English. Cr 100 pages, with Plates and Illustrations Price

AN AVIATION CHART. A large Wal showing a typical Aeroplane Power Plan Section, with all important components Folding to Pocket Size. Price Net

London: CROSBY LOCKWOOD & 7 Stationers' Hall Court, E.C.

Just published. 360 *pp. with Illustrations,* 4¾ 6¾ *in., limp cloth. Price* 6/- *net (postage,* 4

The Aviation Pocket Book for

By R. BORLASE MATTHEWS, Assoc.M.Inst.C.E., F.Ae.S.

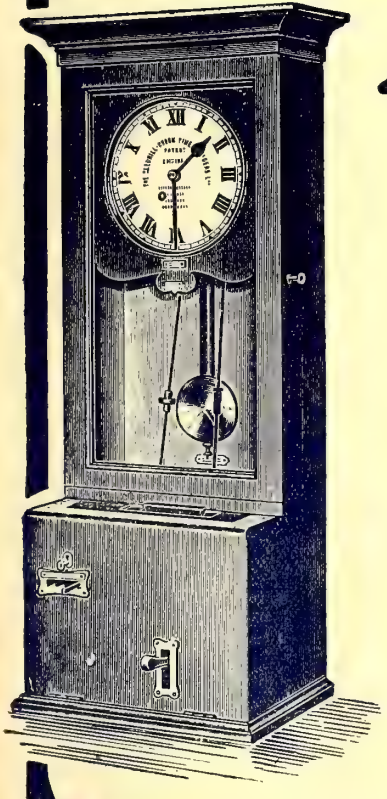
Containing data on Aeroplane Theory and I Air Pressure and Resistance, Structural Ma Engines, Typical Aeroplanes, Piloting, R Meteorological Data, Scouting and Signallin etc. With Glossary and other information o to all interested in Aviation.

Prospectus on Application.

London: CROSBY LOCKWOOD & 7, Stationers' Hall Court, E.C.



Always up to time



THE TIME STAMPED
ON THE CARD...
ALWAYS AGREES
WITH THE CLOCK

A BRITISH MACHINE
THROUGHOUT.....
ENSURES CORRECT
ESTIMATES.....

THE GLEDHILL-BROOK TIME RECORDERS LTD
26 Victoria St LONDON, S.W. 44 Hill St BIRMINGHAM.
43 MARKET St HUDDERSFIELD.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 46 7 4648 HAMPSTEAD.

EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passag London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London

THE AEROPLANE

Edited by C. Grey

WEDNESDAY, MAY 29, 1918.

Vol. XIV. No. 22. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

John Dawson and Co. (NEWCASTLE-ON-TYNE). Ltd.

Newcastle-on-Tyne.
TELEPHONE ... ... CENTRAL NEWCASTLE 2604
TELEGRAMS ... ... "DEPENDABLE, NEWCASTLE."

Southampton House, High Holborn, W.C.1.
TELEPHONE ... ... HOLBORN 1875.

Auster LONDON. FOR Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE NON-POISONOUS DOPE

SEE ADVERT. INSIDE.

TELEPHONE:- OLDBURY 111. ACCLES & POLLOCK, LIMITED. TELEGRAMS:- ACCLES OLDBURY.

WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.

SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc. TRIPLEX SAFETY GLASS The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Gothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street, BIRMINGHAM.

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK.

SAFES.

COOKE'S (FINSBURY) LTD.

FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

Telephones { LONDON WALL { 6179 573

See Telephone Book relating to our Shopfitting, Signs and other Departments

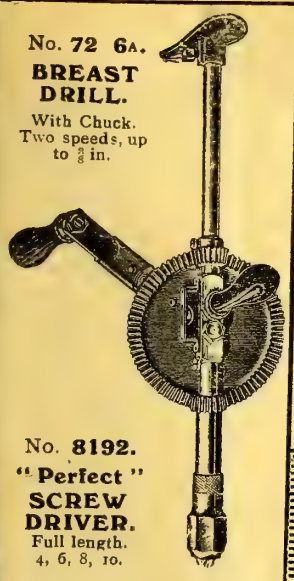
Brown Brothers LIMITED

Head Offices and Warehouses: GT. EASTERN STREET, LONDON, E.C. 2.

BBL

Branches at Manchester, Paris, and Melbourne.

SMALL TOOLS For Aircraft Workers SUPPLIED FROM STOCK.



No. 72 6A. BREAST DRILL. With Chuck. Two speeds, up to ⅜ in.

No. 8192. "Perfect" SCREW DRIVER. Full length. 4, 6, 8, 10.

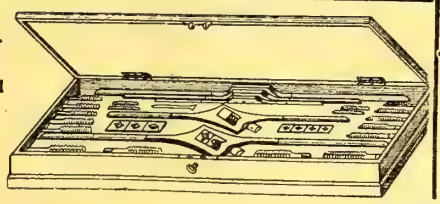
When you are wanting Tools of any kind write or 'phone your requirements. We carry a comprehensive assortment of small tools and can usually give immediate deliveries from Stock.

8192.

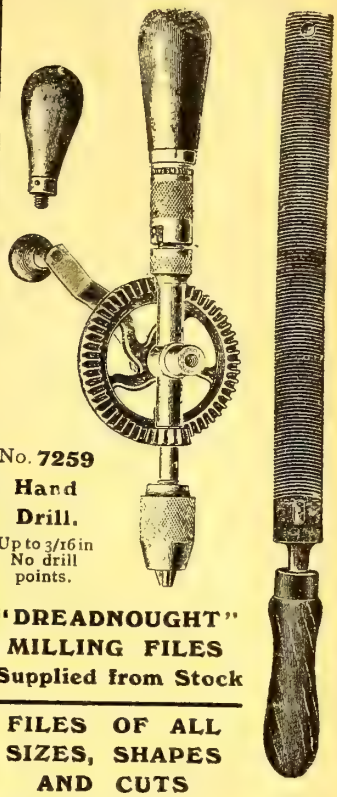


o. 8231. Copper Solder rons, with wood handles ½ lb. upwards.

Best Quality English Stocks & Dies. International Standard Metric Thread 8 sizes.



No. 8308A. 5 to 12 m/m, one stock and tap wrench.
No. 8308C. Ditto, 16 sizes. 5 to 20 m/m, 2 stocks and 2 tap wrenches.



No. 7259 Hand Drill. Up to 3/16 in No drill points.

"DREADNOUGHT" MILLING FILES Supplied from Stock

FILES OF ALL SIZES, SHAPES AND CUTS Supplied from Stock.



No. 7061. Improved Blow Pipes, ⅛in. to ½in

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Metal Fittings a Speciality.

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

GOVERNMENT CONTROLLED ESTABLISHMENT.
UNDER THE MUNITIONS OF WAR ACT.

ADAM, GRIMALDI & Co., LTD.

AIRCRAFT MANUFACTURERS
CONTRACTORS TO H.M. GOVERNMENT

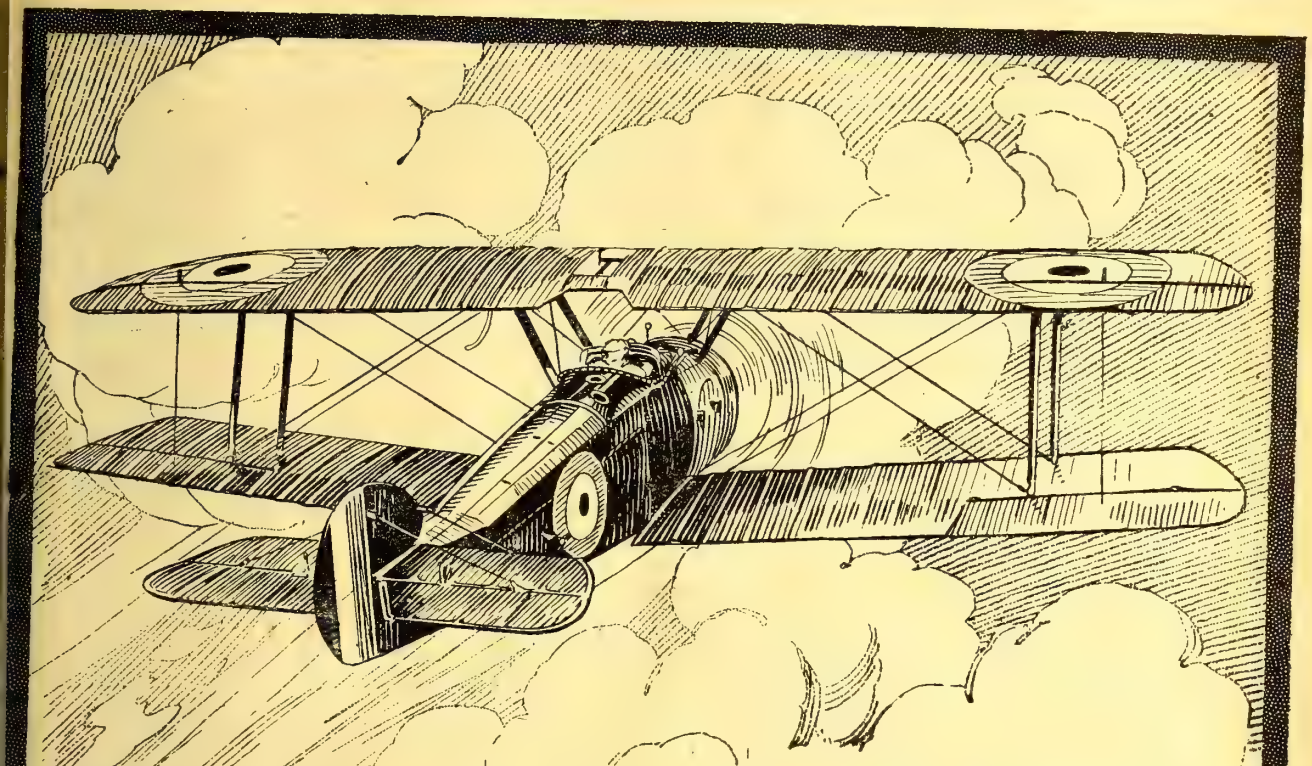
OFFICES: GLASSHOUSE STREET,
ALBERT EMBANKMENT, VAUXHALL, S.E. 11
Telegrams; "Autocoach, 'Phone, London." Telephone: Hop 5552 (3 lines)

HANDLEY PAGE
LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.
HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



BOULTON & PAUL LTD NORWICH

HONI SOIT MAL Y PENSE
DIEU ET MON DROIT
By Appointment

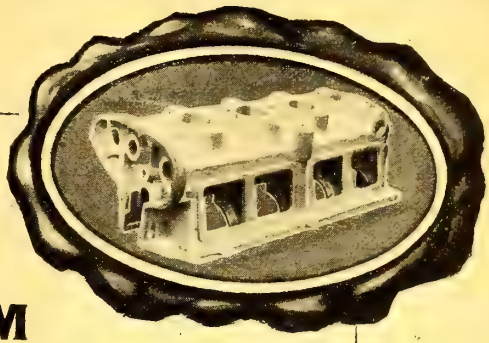
IN the production of Aircraft in the Boulton & Paul works we have two ideals—to furnish our customers with goods of the finest class and our workers with the healthiest and happiest way of making their livelihood. At present we are not in a position to consider any offer of further contracts. After the war our resources will be at the disposal of Great Britain and her Allies.

BOULTON & PAUL, LTD.
Makers of Aircraft NORWICH
Founded 1797

Telegrams: Aviation Norwich.
Telephone: Norwich 851


WHITEHEAD
AIRCRAFT
RICHMOND
SURRE

Sterling



ALUMINIUM CASTINGS.

1. High Tensile Strength. Thoroughly sound.
2. Uniform in analysis, strength and weight.
3. Highly finished and accurate — machine moulded up to largest sizes.
4. Exceptional daily output per pattern.

AIRCRAFT AND MOTOR ENGINE CYLINDERS, CRANKCASES, PISTONS, Etc.

We also make cylinders and pistons in STERLING IRON; castings in phosphor and 5 ton manganese bronze.

Sterling Metals, Ltd:
WIRE: "STERMET" COVENTRY
PHONE: COVENTRY 881
Coventry.

holds.

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co Ltd

CONTRACTORS TO H.M. GOVERNMENT.

Designers and Manufacturers of all Types of Aircraft for Overland and Oversea Purposes, Flying Boa's, etc.

Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

229-231, Hammersmith Road, W.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.

We can deliver A·G·S. Shackles 158 Sizes A, B & C in any QUANTITIES AT ONCE

Contractors to the Air Ministry and their leading Constructors.

The Actual Manufacterers

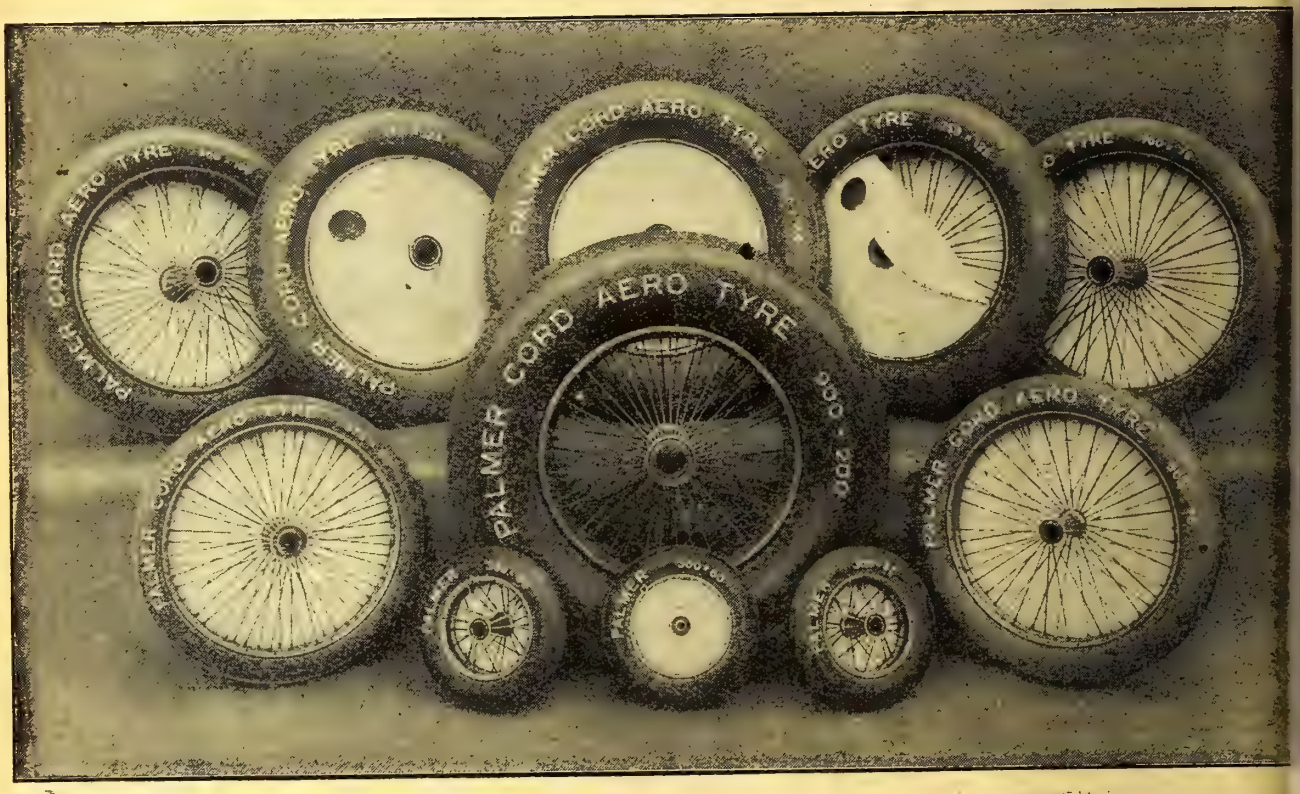
The British Gold Shell Ring Co., Ltd., Hounslow, Middlesex

Telegraphic Address "GOLSHEL, HOUNSLOW"

Telephone Address HOUNSLOW 254.

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m/m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×100	33	150.	38.09	Central	800×150	†41	185.	55.	Centr
,,	17	72.39	12.7	Central	,,	77	178.	44.45	132/46	,,	82	185.	55.	135/5
450×60	30	89.	31.75	Central	,,	92	185.	55.	135/50	,,	85	185.	55.	Centr
575×60	21	160.	28.	Central	,,	95	185.	55.	Central	,,	106	185.	47.62	135/5
,,	34	150.	31.75	104/46	,,	96	178.	55.	132/46	,,	†205	185.	60.32	Centr
,,	111	150.	38.09	104/46	,,	99	178.	38.89	132/46	1000×150	97	250.	65.4	Centr
650×65	78	178.	44.45	132/46	,,	112	150.	40.	Central	,,	102	185.	55.	125/6
,,	79	178.	44.45	Central	650×125	119	178.	55.	132/46	,,	201	185.	60.32	125/6
,,	100	178.	38.09	132/46	750×125	33	150.	38.09	Central	900×200	107	185.	55.	Centr
,,	101	178.	31.75	132/46	,,	77	178.	44.45	132/46	,,	108	185.	55.	125/6
600×75	21	160.	28.	Central	,,	92	185.	55.	135/50	,,	120	185.	66.67	125/6
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Centr
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	208	185.	60.32	125/6
700×75	78	178.	44.45	132/46	,,	99	178.	38.89	132/46	1100×200	52	185.	55.	116/6
,,	79	178.	44.45	Central	,,	112	150.	40.	Central	,,	57	185.	55.	Centr
,,	100	178.	38.09	132/46	800×150	†36	185.	55.	135/50	,,	203	185.	60.32	116/6
,,	101	178.	31.75	132/46	,,	†40	185.	60.32	135/50	,,	204	185.	60.32	Centr

†Wheels Nos. 36, 40 41, and 205 are of stronger type than the other wheels for 800 x 150 tyres.

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE-ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

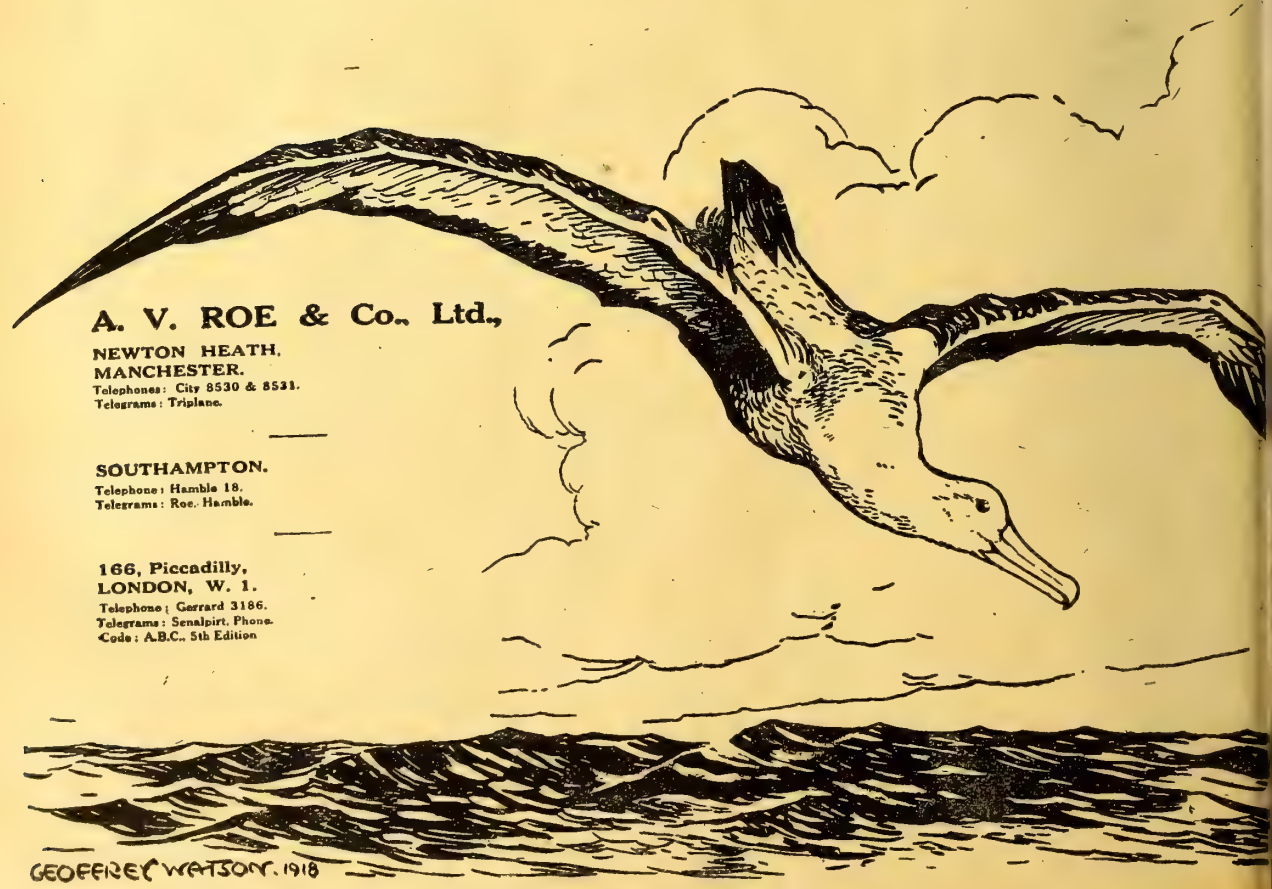
AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.



AVRO

AEROPLANES
AND
PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Senalpirt, Phone.
Code: A.B.C., 5th Edition

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London, W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON WASHING DIRTY LINEN.

Despite the heading which appears above, these notes ave but little to do with the subject of aeroplane fabric, ough in all conscience there is enough metaphorical irty linen in that department to keep a whole com-ittee of the usual official washerwomen busy for onths. Rather these notes are concerned with the bric of the Air Force, in the broadest sense of the ord.

On various occasions one has ventured to hint mildly at the essential evil in our national make-up is that rious psychological phenomenon which is known mmonly as the Nonconformist Conscience. Why onconformity in general should have been saddled with is particular national vice is rather hard to explain, cept that possibly the grocer who goes to Chapel ree times on Sunday, has prayers twice a day at home, d puts sand in the sugar systematically during busi-ss hours is a more contemptible person than is the ortsman who never goes to Church at all and makes living by open and honest swindling. One has no nplaint against the crook who makes no pretence righteousness.

Anyhow, that attitude of mind which is called for nvenience the Nonconformist Conscience finds its ex-ession in the proverb concerning the alleged evil effect washing dirty linen in public. The greatest crime this country is the crime of being found out. Con-quently, whenever there is official dirty linen to be shed, it is washed in private. Hence all the official uses, on the score of confidential documents, secret reements, and so forth, whenever a public enquiry demanded. And hence the outcry against damaging *moral* of troops or causing loss of confidence among people whenever too searching questions are asked either House of Parliament.

Of course, the true reason for refusing to wash official en in public is not that such a performance may have effects on troops or people, but that it involves the vitable exposure of the incompetent officials who e responsible for the dirtying of the linen. The th of this statement was excellently proved by the orious Air Enquiry of 1916.

he agitation which caused that enquiry began at a e when the *moral* of both the Flying Services was er than it has ever been, either before or since. If were possible for exposure of incompetence at ie to have evil effects on people in the field, then ainly the Flying Services, especially the R.F.C., ht, by all official theories, to have gone to pieces as n as the agitation showed how rottenly the affairs the Services were being managed in this country, as the agitation increased so the *moral* of the Ser-s increased with it.

The Simple Reason.

he reason was perfectly simple, and the same reasons as simple to-day and will be at any other period in the future when exposures become necessary. As Mr. Kipling has said:—

> "The toad beneath the harrow knows
> Exactly where each tooth-point goes.
> The butterfly upon the road
> Preaches contentment to that toad."

Toads and Butterflies.

The R.F.C. at the Front knew exactly where their troubles come in, and the gaily-tabbed, be-ribboned, brass-hatted officials in this country, or well behind the lines in France, preached contentment to them, knowing nothing from practical experience of their troubles—all except a few who made themselves mighty unpopular, and damaged their careers, by supporting the active-service aviators. This council of contentment got on the nerves of the fighting men worse than anything else. Preaching peace when there is no peace is the most irritating thing in the world.

Now, as soon as the active-service people found that some few of us at home knew about their trouble, and were, in their picturesque language, "kicking up a stink about it," they began to cheer up, for they saw that they had not merely been pushed out to France and forgotten. They felt that as soon as the people of this country knew that they were badly mounted something would be done about it, and they were right.

The Official Laundry System.

The Englishman is merely a fool; he is not bad at heart; and after a while, despite a Coalition Government, and a "doped" Press, and suppression of evidence, and all the usual cant about confidential documents, the ordinary common Englishman grasped the idea that something was wrong, and then the official people realised that it was time to get on or get out. So they went on, and formed the Air Board, with very good effect.

The dirty linen of the period was not washed in public. All the public heard was the process of washing going on behind closed doors. But the linen was hung out to dry in public afterwards—in a beautiful official report—which, at any rate, showed that something had been done about it. Some people said that it had not been washed, but merely whitewashed. Personally one believes that quite a deal of real washing was done, and that then it was glazed over with some of the dirt underneath the glaze—much as the highly scientific laundries of to-day treat one's pet collars.

Spring Cleaning.

Anyhow, the Flying Services were immensely braced by such exposures as did come out. And still more good would have been done if the Enquiry Committee had had the power to take evidence on oath and to subpœna witnesses, for then it would have been possible to have exposed still more dirty linen to be disinfected by full ventilation. As it was, quite a number of nasty

little microbes remained, and, though many have since been cleared out by the Air Board, their progeny remain in sufficient numbers to make it worth while for the Air Minister to institute a special Spring Cleaning of the Air Ministry as soon as he has settled down comfortably in his new office.

The present moment seems particularly opportune, for the *moral* of the Royal Air Force is so high that, even if the whole operation were carried out in public, it would not depress the active-service people in the least. Their tails were well up, as General Salmond put it, some months ago, and they are still better pleased with themselves to-day. Anything which would show them that still greater improvements are being made at home for their benefit would tend to increase their moral superiority over the enemy.

It might not inspire them to still greater efforts, for one believes that no human beings could do more than the R.A.F. people abroad have done during the past six months and more, but the knowledge that the production of still better machines, engines, and armament is being materially accelerated by the cleaning out of certain departments and by the reorganisation of bad systems would certainly enable them to go about their work of killing Huns with lighter hearts and a greater certainty of final victory.

An Example of Hypocrisy.

One of the characteristics of our racial hypocrisy is our habit of making a great parade of our cleanliness when we do a bit of washing. Take for example the Loch Doon affair. On Monday, May 20th, the "Times" devoted quite half a column of its precious space to extracts from the report of the Select Committee on National Expenditure, which showed in some detail how a trifle of £500,000 had been wasted on trying to build an aerial gunnery school at Loch Doon.

As a matter of fact the scheme was quite good. It was somewhat elaborately planned, and it might have been wiser to have started it in quite a small way, with seaplanes only, so that the expenditure could have been spread over several years. There was no real need for a big aerodrome for land machines, and apparently it was the attempt to make an aerodrome out of a peat bog which broke the scheme.

An Official Report.

The extracts from the "Times" report are of interest. The Committee state:—

> The only possible site for an aerodrome, and, indeed, the only place on the shores of the lake where an aeroplane could land without crashing was the peat bog on the western side. It was an essential part of the scheme to drain this bog to make it serviceable as an aerodrome. When this project came to the Director of Fortifications and Works at the War Office, Major-General Sir George Scott-Moncrieff, he wrote a minute in which he described this as "a very risky measure to attempt," and added, "This is a most serious matter, and I certainly think the scheme ought to be deferred until it is definitely ascertained whether no other alternative is possible." The Chief Engineer of the Scottish Command, however, reported favourably on the practicability of draining the area proposed for the aerodrome, and estimated that the work could be done within three months from the time the labour and materials arrived on the site. Meanwhile Sir David Henderson had written, "Loch Doon fulfils all our requirements, and if the engineering difficulties are not insuperable I would like it proceeded with at once." A rough preliminary estimate of £150,000 was made for the cost of the works as then proposed, it being added that the requirements would probably increase.
>
> In September a conference was held at the site, it was agreed that it was possible to prepare the site selected for the aerodrome by land drainage, and the works necessary for this and other purposes were planned. The Air Board approved the scheme, and in September, 1916, the work was begun. The Committee go on to say:—
>
> A contract for the greater part of the work was made with a large firm of contractors. As many as 3,000 men were employed, of whom about one-half were German prisoners. Roads were remade, and a temporary railway about 2½ miles long laid from Dalmellington towards the lake; 56 miles of pipes were laid to drain the bog. Soil to the depth of 3in. to 4in. was spread over a large part of it to form a new surface, and grass seeds were sown. Railways, to standard gauge, were made some miles in length, up and down the hills to the east of the lake, and by the waterside together with considerable lengths of steel constructions along which it was intended to run by electricity movable targets to be fired at from the air. An electric power-station was constructed and boilers and generators installed. Large hangars and a seaplane shed were erected there also, and a motor-boat dock was constructed. Waterworks and sewage works on the bacterial system were made for a population of 1,500. By May, 1917, the estimate of the cost had increased to £350,000.

The Air Ministry having been constituted in December, 1917, two members of the Air Council, Major Baird, the Parliamentary Under-Secretary of State, and Sir John Hunter, the Administrator of Works and Buildings, visited Loch Doon early in January, 1918. On their report, and on a consideration of all the circumstances, the Air Council unanimously decided that the whole enterprise should be abandoned forthwith, and the Army Council agreed. The dismantling of the works began at once, and the personnel and all movable materials have been or are being transferred elsewhere.

The following considerations combined to lead the Air Council to their decision:—

(1) The Commandant who had been in charge of the proposed school for nearly a year, Lieutenant-Colonel Gordon, reported that no flying would be possible on half the days of the year on account of climatic conditions. He stated that on many of the other days the conditions would not be good for instruction on account of the low clouds. The need for airmen at the front is always pressing. The weather at Loch Doon would cause the school to become a bottle-neck to the whole course of training, and would slow down the supply of airmen to the armies.

(2) It was represented that "bumps" were very bad on the targets, and that this would often interfere with the value of the practice.

(3) With the much faster machines which had come into use during the year and a half since Loch Doon was first planned it was doubtful whether it would be safe to fly at hill targets at all.

(4) For the same reason the speed of the movable targets, which varied from 25 to 60 miles an hour, had become too slow to represent fighting conditions.

(5) There was no place in the neighbourhood of the lake where a forced landing could be made without crashing except on the aerodrome itself, and the flying would frequently be at a height insufficient to allow the aerodrome to be reached in the event of engine stoppage.

(6) It was doubtful whether the drainage of the aerodrome would ever succeed in providing a place on which aeroplanes could land without danger and take off without difficulty. After a spell of wet weather it might still be found little better than a bog.

(7) Great sums had already been spent, and large further sums, for extension of Bogton aerodrome and for the railway were being asked for to complete the scheme. Materials and labour were urgently needed elsewhere. The date of completion seemed still remote. It was thought better to decide once to sacrifice what had been spent than to throw good money after bad.

The Committee point out there is by no means unanimity of opinion on these points, and, while they refrain from expressing any opinion on technical questions, particularly on points on which the views of airmen and engineers are divided, the weight of evidence has led them to the conclusion that Loch Doon ought never to have been chosen as the site for the school that was projected.

How It Is Worked.

Now there you have an excellent example of official washing in public, when so disposed. Observe the frank and open honesty of it all. Observe how officialdom freely admits its error of judgment. No individual is pilloried, or court-martialled, or cashiered, or even Stellenbosched—so far as one can gather. The British taxpayer is told apologetically that he has lost half a million pounds, and officialdom, as represented by the Committee, admits the awfulness of the mistake.

But the real officialdom, which is Messrs. George & Co., know perfectly well that when the taxpayer is thinking in terms of war expenditure at the rate of six or eight millions a day he is not going to worry about half a million, any more than he is going to worry about losing sixpence if he is earning 8 shillings a day, or about losing half-a-sovereign if he is earning £8 a week.

t was a fairly safe subject on which to make a hypo-ritical parade of washing dirty linen in public.

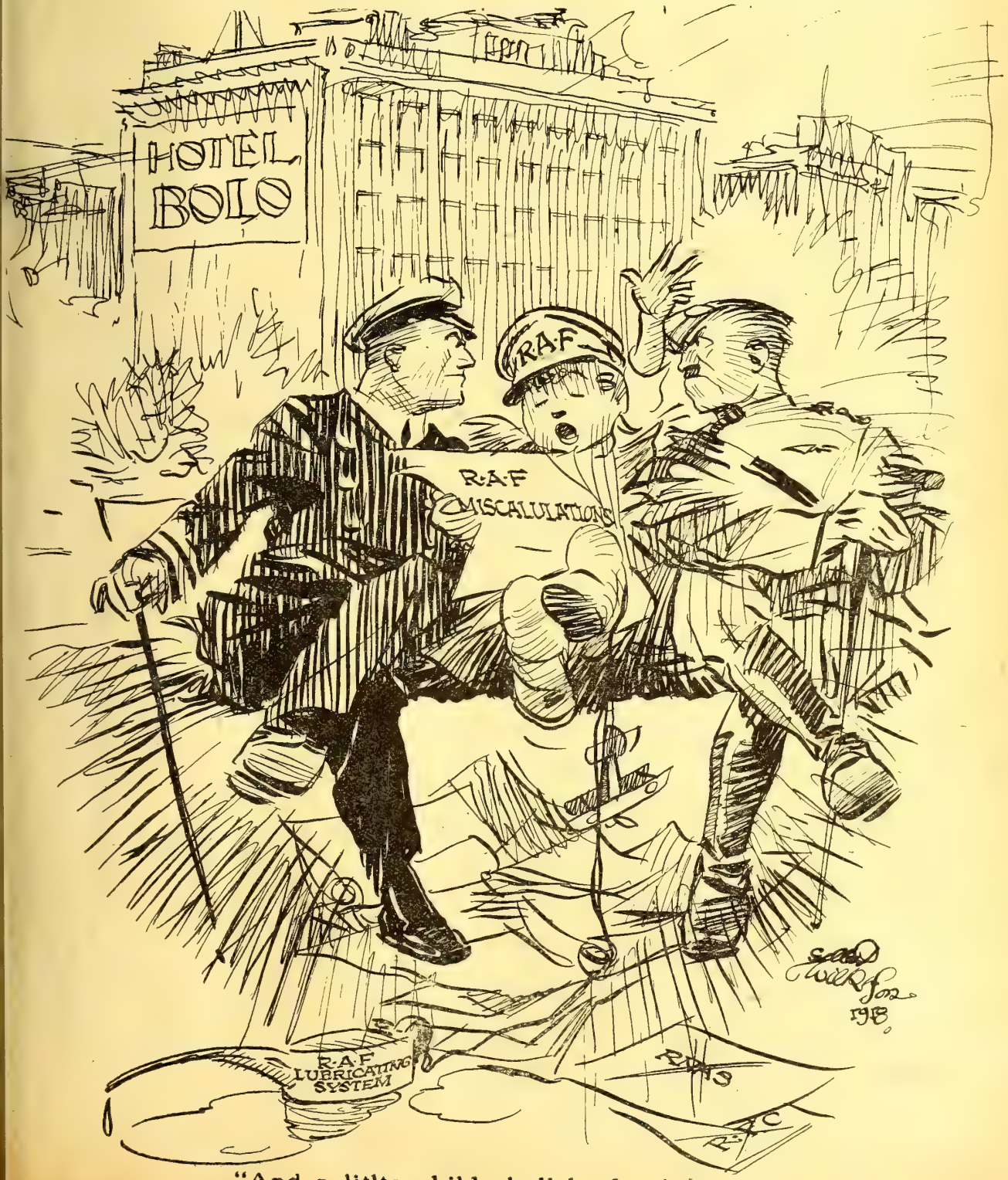
THE OFFICIAL ADVISERS.

As a matter of fact, it would not be at all hard to ind excellent reasons for going on with the Loch Doon ob, if not on quite such an elaborate scale, and using he works already built or building for their proper urposes, instead of scrapping the lot.

It will be observed that the scheme was ultimately urned down on the advice of Sir John Hunter and Iajor Baird. So far as Sir John Hunter is concerned, ne believes him to be an honest gentleman with great nowledge of lands and buildings. As such he would e a fully competent authority concerning the drainage f peat-bogs, but one doubts whether he could judge the opographical or meteorological *desiderata* of a gunnery school, and the latter are, after all, the more important factors in this matter.

As regards Major Baird, what he does not know about flying, including aeroplanes, engines, armament, aerodromes, and air fighting—with the exception of hot-air fighting in the House of Commons—would fill pretty well every book ever written on those subjects. One would hesitate to condemn a dope-can, let alone a half-million pound gunnery school, on Major Baird's evidence or opinion.

Not that he lacks opinions, either of himself or of anything else in creation, but merely that whenever he has expressed an opinion in public he has been so amazingly wrong. Therefore the mere fact that Major Baird advised against the Loch Doon school predisposes one to believe that it must be of considerable value.



"And a litlte child shall lead them."

An Easy Camouflage.

However, all this parade of virtue over the Loch Doon affair serves as a very pretty camouflage for the far greater waste of money in other directions. Does anyone think, for example, that five hundred thousand, or five million pounds for that matter, would cover the waste of money on "dud" engines and "dud" aeroplanes in the first three years of the war.

At a rough guess one would say that the scrap needlessly produced in making R.A.F. engines and B.E. biplanes alone cost well over the Loch Doon half-million. It only takes 500 engines at £1,000 apiece to tot up to that amount, and it would not be difficult to find so many engines at such a price, apart from R.A.Fs., which if not absolutely useless have been so nearly so as to justify one as classing them also as scrap material.

Then one might start to count up the amount of perfectly good material, and partly manufactured components, needlessly scrapped by the A.I.D. There is the basis in that department alone for a searching inquiry on National Expenditure.

If one inquired as to the relative cost of the "90 per cent. clerk and 10 per cent. inspector" methods of the A.I.D. it should be possible to discover quite a considerable waste of public money in this direction. Even at the low rate of wages paid by this department, it does not take long for some few thousands of officials to absorb in a perfectly honest but utterly wasteful manner several hundreds of thousands of pounds.

Waste of Time.

There is also the subject of indirect waste to be considered. When a new aeroplane or new engine of recognised excellence is produced, it is wasteful to keep it hanging about before putting it into quantity-production and to go on turning out less efficient or less effective types.

It is a matter of history that the "1½ strut" Sopwith was produced in June, 1915, and only began to appear in quantities in France towards the end of 1916. It would have economised material and aviators if it had been delivered in hundreds in the early spring of 1916, as it might have been but for official blundering.

There seems to be a need even now for careful investigation into the time which elapses between the introduction of a new type and its adoption as a quantity-production proposition. One has already stated, some weeks ago, that too much time has been wasted in needless academic experiments with new machines and engines. And in war time is even more valuable than money. Only, unfortunately, there is no Select Committee on National Expenditure of Time.

An Opportunity for the Air Minister.

Here there seems to be another great opportunity for the Air Minister. A Committee, select or otherwise, might well be appointed to investigate and report upon the expenditure of time between the introduction of new types of machines and engines and their actual appearance on active service.

It would probably be found that the department which has to deal with the original designs of aeroplanes on drawing-paper, and with such things as stress-diagrams and so forth, is extraordinarily quick in making up its mind, and is very seldom wrong in its judgment. One can recall no complaint for a year or more from any designer that any really promising design has been turned down, nor that any unreasonable delay has been caused, nor that any irrational alteration has been demanded.

Everything possible seems to be done to encourage the building of promising experimental machines, and to expedite their production. The department seems to be composed of people with practical experience, common sense of the most uncommon kind, and an ardent desire to get on with the war.

It is only after the experimental machines are actually in being that the waste of the nation's time seems to begin. And it is only then, apparently, that the victims fall into the hands of people of the kind who made the R.A.F. such a national disaster when it was a power in the land. One has an uncomfortable feeling in fact, that many of the people who cause the trouble are, in fact, only the old R.A.F. crowd spread over new departments.

A Simple Shibboleth.

One would suggest to such a Committee as one has indicated, or to the Air Minister, if he takes unto himself the task of investigation, a simple test as to the suitability of an official for his job—as simple a test as the "*Shibboleth*" of the Hebrew Committee of Enquiry at the ford of Jordan. It is merely to ask each official whether he has been employed at the late Royal Aircraft Factory—now called the Royal Aircraft Establishment to distinguish it from the Royal Air Force.

If he has been there, then send him off to do twelve months on active service, just to enlarge his mind and impress on him that getting on with the war is more important than parlour tricks at an experiment station or in a London office. And apart from the actual R.A.F. people, every technical official or officer who has to do with aeroplanes, engines, or armament, should do at least a week on active service in every two months so as to keep his knowledge of aerial warfare right up to date.

A Chance for the Pilots.

One feels sure that active-service pilots would be delighted to take turns in giving the technical chiefs of the engine department, for example, two joy-rides a day—or preferably one per day and one per night—over the enemy's lines for a week on end, just to demonstrate to them the reliability or otherwise of the engines which they supply and the constant need for newer and better types. And one feels sure that such an elevating spiritual experience would greatly assist these gentlemen in accelerating the decisions which the High Authorities call upon them to make from time to time.

One mentions the engine department in particular because it has long been the outstanding example of misapplied official methods. Our pre-eminence in engines is due entirely to the obstinacy of our engine manufacturers, and has arrived in spite of, and not because of, the people who ought to have produced that pre-eminence.

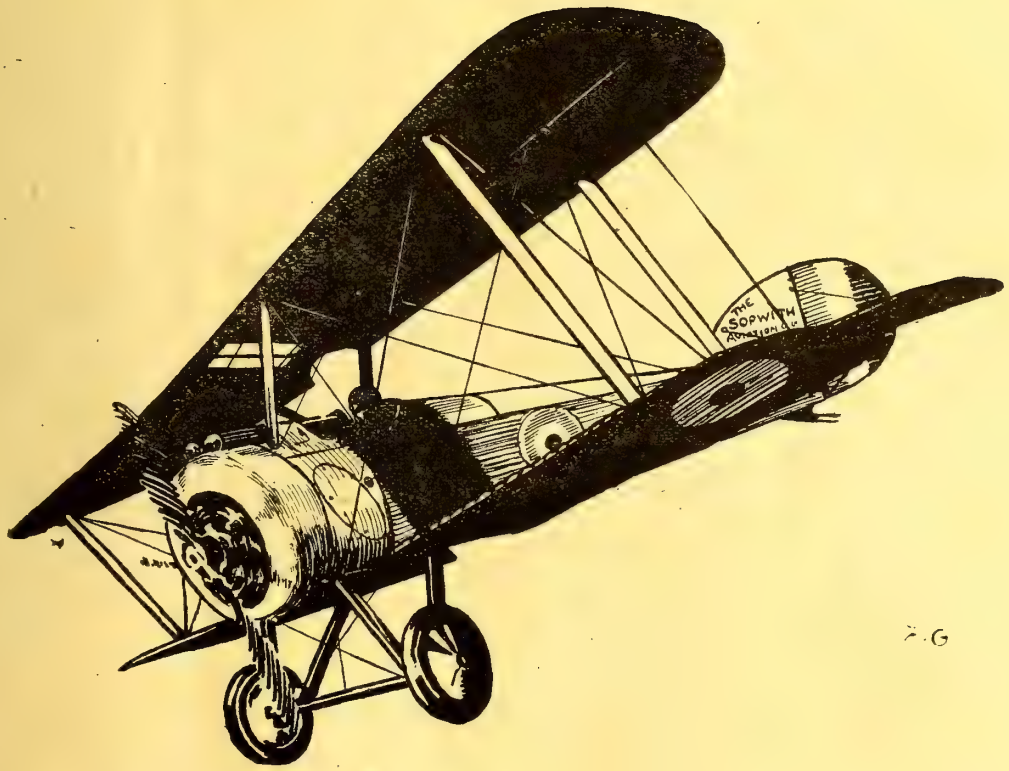
The Personal Equation.

If some such system of education were instituted, one feels that there would be considerable acceleration in fixing and producing new designs, and much saving of the nation's time which is now wasted by officials who are concerned in looking after their own or their friends' interests or in downing some firm or individual for which they have acquired a dislike.

If all the officials of the Technical and Production Departments knew that in a few weeks' time they would have to fly over enemy fire on whatever type of machine happened to be current at the moment, they would be mightily concerned that the machines at the front should be of the most efficient, that the engines should be perfectly reliable and of the lightest for their power, that the timber should be quite trustworthy, that the fabric should be entirely fire-proof. They might even demand the use of parachutes.

And they would be equally concerned that when a new and superior machine or engine appeared it should be got out on active service at the earliest possible moment.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

SBAC

Paris Office:
21, RUE DU MONT THABOR.

This simple scheme alone would save the cost of Loch Doon many times over in a year, and one recommends it strongly to the Air Minister or to any Committee which he may appoint to investigate the waste of time, and consequent waste of men and money, which occurs between the first appearance of a new machine and its production in quantities. There is no need for any vast amount of public washing, but the washing ought to be done.

Washing Out or Whitewashing.

Let it be freely admitted that very great improvements have taken place in the past 18 months, and that waste and delays are far less than they have been in the past. That is all the more reason for clearing up the dirty corners which remain. It is so much easier to find the bad spots now, when so much is good, than it was when Sir William Weir first began to evolve order out of chaos.

One gathers that certain new departmental chiefs are themselves busy doing their own bit of washing. It remains to be seen whether it consists in washing out the inefficients in their departments, or in whitewashing their departments in the eyes of the Air Council. There is much washing out to be done, some of it pretty high up in the official scale, and it must all be done before the Air Ministry, or rather that portion of it which is also under the Ministry of Munitions, can be considered worthy of the people on active service.

Also, one believes that Sir Arthur Duckham is the man to do the necessary washing out. There are those who say that the whips of Weir will become the scorpions of Duckham (*vide* the Scriptural analogy) when once the new Chief has had time to look around him, so inefficient, self-seeking, and self-satisfied officials will be well advised to keep an eye open for jobs somewhere else when the trouble begins. Possibly when he has done with the various departments there will be no need for washing dirty linen in public. A little strong acid and a power-driven vacuum cleaner applied privately to the whole Department of Aircraft Production in the bad spots may, after all, do the job better.

An Averted Storm.

There have been threats of another Parliamentary storm blowing up over some of the matters at which one has ventured to hint in these notes, but so far it has not developed seriously. The inclination seems to be rather to give the new people a fair chance of settling down to their jobs and making good. Which is obviously the right thing to do.

If the minor departmental chiefs avail themselves of this respite to put their departments in order, so much the better for them, as well as for the active-service people. But, because the active-service people are the only people who matter at all, and because the whole Air Ministry and all its departments exist solely for their good, one is fairly safe in promising a mighty uncomfortable washing day for any department which is run in its own interests rather than in the interests of the active-service aviators.—C. G. G.

THE BOMBING OF HOSPITALS.

The "Times" correspondent on the Western Front writes on May 23rd as follows:—

There is one place in France, far away from the battle area, where we have a large group of hospitals. The hospital tents there cover a great area of ground. The Germans are perfectly well aware of the character of the place, and they selected it as the object of a bombing raid last year. They have again been attacking it, and the size of the tract of ground covered with hospital outfits and the entire absence of any concealment make it a mark which no aviator could possibly miss. An aviator blind and drunk could let bombs fall from any height in any wind and weather, and they must land somewhere among the attendants' quarters or on the tents where the nursing sisters move among the rows of cots with their helpless occupants.

On Sunday night the Germans attacked the place with all the ferocity of which they are capable.

To my mind the thing is one of the most horrible episodes of the war, rivalling the sinking of hospital ships or the "Lusitania," and as damning of German character and ways of thought as the murder of Miss Cavell or the blackguardly treatment of helpless British prisoners. It is one more of those things by which the Germans proclaim themselves as lepers outside the pale of civilised nationalities.

Sunday's raids lasted from soon after 10 at night till after midnight. There was a short interval at half-past 11, and evidently two separate parties were employed, numbering between them over a score of machines, from which a great number of bombs were dropped, many of the very largest size, making craters in the ground 15 and 20 feet across. The scenes inside the the tents were of the most piteous description, and the total casualties to patients, sisters, medical officers, and attendants must have far exceeded those of any London air raid. The redeeming feature of the whole horrible affair was the magnificent behaviour of the hospital staffs, including the nursing sisters.

Taught by the experiences of last year—which showed that the Red Cross, instead of being a protection against German barbarity, was rather an incitement to attack—the authorities had provided shelters to which the sisters and others could have gone for refuge and saved themselves. But the cots were filled with the helpless wounded, many hundreds of whom could not be moved, as they were obliged to remain in some fixed position. The attendants utterly refused to leave their patients, but all the while the dreadful carnage went on the nurses moved about among the beds, smiling and doing their best to keep up the courage of their poor charges. No single sister seems to have failed, but every one rose triumphantly to the ordeal. Too many of them paid the price of their heroism with their lives or by being wounded.

As a result of former experiences also, there are anti-aircraft guns in the neighbourhood, and one of these brought down one of the raiders, a Gotha with three occupants, two of whom were wounded and one uninjured.

Some of the enemy machines came down and used their machine-guns, raking the hospital tents and attendants' quarters with fire from low altitudes. No circumstance of savagery seems to have been omitted. If the members of some savage tribe committed against the Germans one tithe of the horrors which the Germans perpetrated on Sunday night, the Germans would consider themselves justified in wiping the whole tribe off the face of the earth, and the civilised world would probably approve of their action. It is impossible not to wonder when the Germans will awake to the extent to which they are crystallising the world's contempt and hatred of them as a people, so that their name will be a name of loathing for generations.

The captain of the machine brought down, who was wounded, and is now being cared for in the hospital he bombed, was formerly in the German Diplomatic Service. He tried at first to excuse himself by saying that he saw no Red Cross. When challenged with the fact that he knew that he was attacking hospitals he endeavoured to plead that hospitals should not be placed near railways, or, if they are, that they must take the consequences. Apart from the fact that hospitals must be near railways for the transport of their patients, in this case, as in the others, the raiders were not attacking the railways, but came deliberately to bomb the hospital area, and knew perfectly well what they were doing.

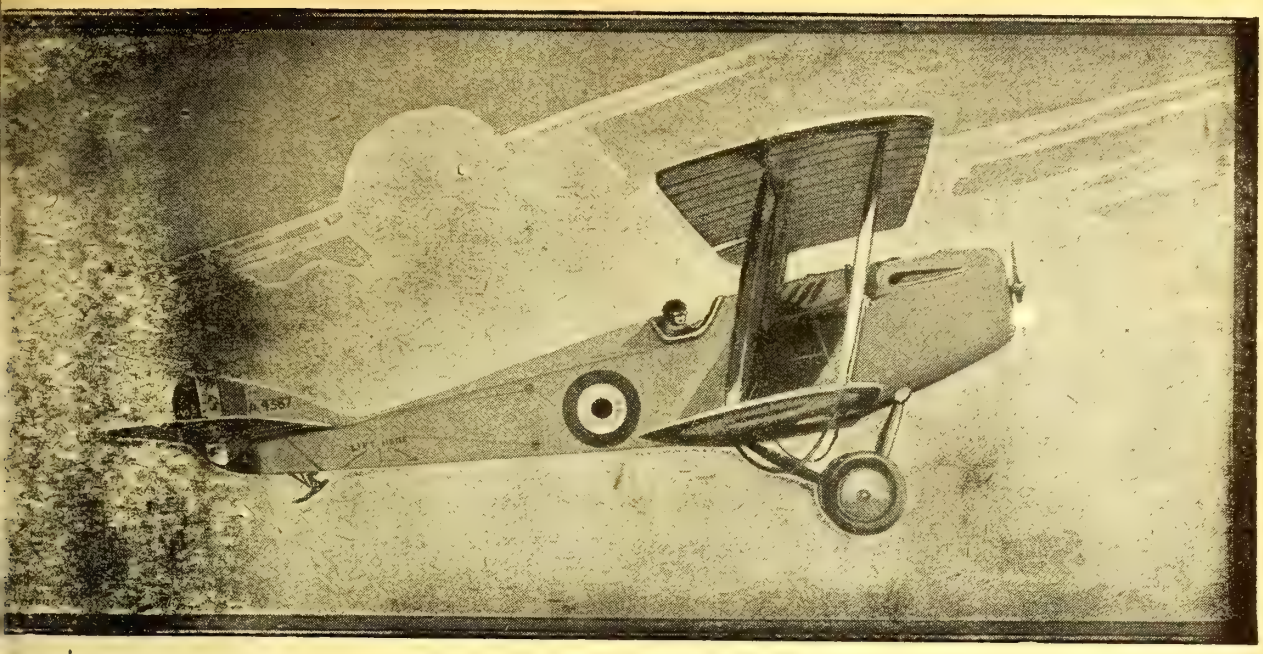
[One awaits with interest the German explanation of this affair. The Hun is not a nice person, but he is not a fool. He lacks chivalry, but he sticks strictly to the rules of war. One aviator, half fool half savage, might bomb a hospital on purpose, but a whole squadron would not bomb a whole hospital camp unless they were so ordered for some definite reason, or unless they were misled by their spies into thinking it was a camp full of troops.—Ed.]

THAT RED CROSS MARK.

The following is taken from the "Daily Telegraph" of May 27th:—

Attention has already been called to the photograph taken from the air by British airmen of the German aerodrome at Thionville, where the roof of the main building is conspicuously marked with the Red Cross. The explanation has not been long in coming to light. [The most rudimentary intelligence ought to be able to see that whatever the cross may be it is not on the top of a building, but is on the ground in the middle of an area surrounded by trees.—Ed.]

The Red Cross aerodrome connects itself with the German outrage on Sunday night, when low-flying German aeroplanes bombed a well-known group of hospitals far in the rear of British lines. The Hun tries to pave a way to his fiendish crime by seeking to establish a "tu quoque." He marks an active aerodrome with a lying Red Cross, hoping that the Allied airmen will ignore the obvious lie, bomb the aerodrome, and thus



The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds the World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S·B·A·C

Head Office

WOKING, Surrey.

give him a dialectical justification for referring to his own bombing as a reprisal in kind. He was not given that excuse. He bombed hospitals as he torpedoed hospital ships—because he is the Hun, and his air service has now degraded itself to the level of his navy.

[Opinions among aviators seem to vary as to whether the "red cross" on the "roof of the main building" is not really a cross-shaped fountain in the middle of a lawn, or some such equally exciting mark. The "smudgeographs" in the illustrated papers leave one in doubt. The colouring of the ground and the size of the cross as shown in the "Daily Mirror" and the "Daily Sketch" differ so much between the two papers that one or other appears to have been "faked." Therefore one is not prepared to accept the alleged explanation officially given. —Ed.]

THE VIEWS OF SIR WILLIAM WEIR.

Reuter's Paris correspondent, writing on May 20th, says:—

Sir William Weir, Secretary of State for the Air Force, has been interviewed by the London representative of the "Petit Parisien." He declared that never had the situation given greater cause for hope. In all the Allied countries production was being accelerated in a continuous manner. In England there was not a workman, not a member of the staff, who was not working day and night with the sole thought of surpassing the Germans.

Questioned as to the reality of the Allies' superiority in the air, Sir William Weir replied: "For the moment, yes, perhaps we do have it, and we shall continue to have it if we know how to keep it—so long as we stick to our work."

Sir William Weir does not agree with the views of M. Painlevé on the standardisation of aircraft. "We must continue to perfect every type of machine, whether observation, registering, bombing, or chasing planes," he said. With regard to unity of command in inter-Allied aviation, the Air Minister feared this would meet with many practical difficulties. It was, moreover, more or less realised already by the military unity of command, since all squadrons are attached to established divisions.

AN UNEXPLAINED MYSTERY.

The following appeared in the daily newspapers on May 24th, apparently from an official source:—

While the chief part played by the Navy in connection with the operations in German East Africa has already been made known in official dispatches, several instances of great gallantry have not hitherto been recorded.

Among minor exploits was the salving of a seaplane, which had come down in shallow water off the Rufiji delta. The pilot was captured, but prompt steps were taken to regain the machine. A tug went as near to the shore as her draught allowed, and opened fire on an enemy stockade, in which two guns were mounted. Meantime a motor-boat pushed on at high speed towards the spot where the seaplane was lying. The water was too shallow, so, returning, she obtained a long heaving line. With this and a signalman from the tug, who volunteered his services, the motor-boat went back. When the boat could approach no nearer the signalman jumped over, waded up to the seaplane in spite of hot rifle-fire, and made the line fast to the machine. Then he returned to the boat, which started to tow the seaplane back. The motor-boat grounded, but all hands at once jumped outboard and got her clear. The seaplane was salved. It had been struck by 60 projectiles, while the motor-boat and the tug had each been hit five times.

[This evidently refers to the days of 1914 when Mr. Cutler, one of the early followers of aviation from 1909, who had been flying at Durban, brought an old Curtiss flying-boat up to the East Coast. Mr. Cutler (who was a Flight-Lieut., R.N.) was then taken prisoner and nothing has been heard of him since. As the Admiralty has now dug up this bit of ancient history, perhaps it will now proceed to state officially whether Mr. Cutler is still a prisoner with von Lettow, whether he has died as a prisoner, or whether he has returned from captivity.—Ed.]

OVERSEAS PATRIOTISM.

Sir William Weir, the Air Minister, was on May 24th presented with a cheque for £13,000, representing the cost of eight aeroplanes, the gift of the members of the Overseas Club and Patriotic League. The formal presentation was made by Mr. Hewins, M.P., Under-Secretary for the Colonies, at the annual meeting of the Club at General Buildings, Aldwych. Mr. F. W. Hayne presided, and among others present were Lord Meath, Sir Owen Philipps, M.P., Lieut.-Gen. Sir R. Baden-Powell, Admiral the Hon. Sir E. R. Fremantle, Sir Ernest Birch, Sir Edward Rosling, and Dr. E. Lyttelton.

Sir William Weir said that it was not his intention to advertise the achievements of the Air Force, or to boast of its progress, or to make forecasts of its future successes. That would not be in accordance with the spirit of the Force, as he understood it, for, young as it was, its crowded life had already created a noble tradition and spirit of its own.

He was content to leave the public to judge of its achievements from the official records day by day in the Press. The enemy's judgment would be still more accurate, as it would be based on actual experience.

His policy and that of his colleagues on the Air Council was a comparatively simple one. Whatever the Air Force had done in the past, and was doing now in the face of the enemy, every effort and every energy would be directed to further development and acceleration in the many fields of aerial activity which could effectually contribute to the successful issue of the great cause in which we were fighting.

AMERICAN REORGANISATION.

The Washington correspondent of the "Morning Post" writes on May 21st:—

Immediately after signing what is known as the Overman Bill, which gives the President power at his discretion to consolidate existing Departments of Government or to transfer the functions of one Department to another, Dr. Wilson issued an Order, with the object of bringing about an important change in the Aeronautical Service which will make for efficiency and greatly expedite aircraft production.

Until the issue of the Order the Air Service was under the control of the Aircraft Board, the head of the Board being the Chief Signal Officer of the Army, who was responsible not only for production but also for the training of the personnel and all other matters connected with the Service. In fact, he virtually exercised the functions of a Minister.

The Chief Signal Officer [Brig.-Gen. Squier.—Ed.] now no longer has anything to do with aeronautics, and the manufacture of aeroplanes has been given over to the Bureau of Aircraft Production, of which Mr. John D. Ryan, a New York banker and mine-owner, who was recently appointed by the President with that purpose in view, is the Chief, while the military part of the Service has been placed under the Director of Military Aeronautics, to which position Maj.-Gen. William L. Kenly, who has a high reputation for executive ability and aeronautical knowledge, has been appointed.

With these changes and with the experience gained by manufacturers of aeroplanes during the last six months it is believed that the obstacles in the way of the quantity production of machines have been overcome and that machines should now be turned out in large numbers very rapidly.

The "Times" correspondent writes on May 21st:—

Mr. Hughes, after conference with the Attorney-General, has decided to begin an investigation into the aircraft charges immediately. The proceedings, necessarily in secret, will be in the nature of a Grand Jury inquiry.

A MARK TAPLEY.

In an address given by Mr. W. C. Redfield, Secretary of Commerce in the American Government, at the Canadian Club Ottawa, on May 20th, he is reported as having said:—

There were critics who related stories of failure. He asked the country not to worry about the reported failure of the American Aeroplane factories. He saw one factory recently where the raw material was going in at one end and the finished product coming out at the other.

[One admires the optimism of the speaker, but one does not understand that he should marvel at the spectacle of raw material entering a factory and the finished product leaving it. The phenomenon of finished products entering a factory and raw material leaving it would be more calculated to make the average person marvel.—Ed.]

A REUNION OF GASBAGS.

"Beachcomber" writes in the "Daily Express" of May 22nd as follows:—

I hear that several members of Parliament are urging the Air Ministry to invite our Allies to send representatives here during the summer to discuss aerial matters. Nothing definite has, I am informed, been settled so far.

Provided, however, certain initial difficulties can be overcome, the visit will be arranged. It is felt that with the daily increasing importance of the Air Service a meeting of Allied Parliamentary representatives might be productive of much good.

[It would appear that so long as the soldiers of the Allied nations work together the activities of Parliamentarians are of little account.—Ed.]

INTERNATIONAL AIR TRAVEL.

The "Times" correspondent at Christiania writes:—

The news received from London that it is for the present impossible to grant the request of the Norwegian Air Route Company to start an Aberdeen-Stavanger mail service has caused general regret in the business community.

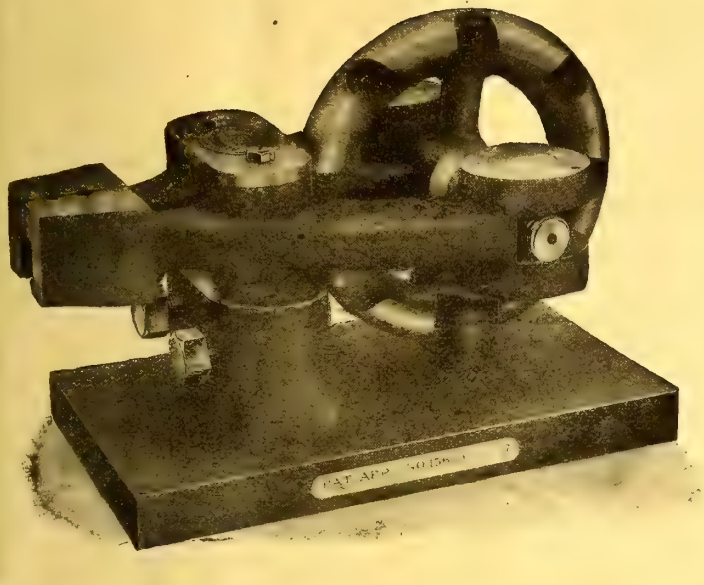
It had been hoped that the present highly unsatisfactory mail conditions, detrimental alike to British and Norwegian interests, would have convinced the British authorities of the advisability of this proposed service, the more so as few machines and no escort would have been needed. [One cannot comprehend the refusal to sanction so simple and so important an experiment. —Ed.]

THE RED AIR FIGHTER.

"The Red Air Fighter," the reminiscences of the late Rittmeister Baron von Richtlofen, is now ready and may be obtained for 2s. 9d. post free from the Aeroplane Publishing Office, 4 Breams Buildings, E.C.4.

S.107.

A wonderful Time-saver

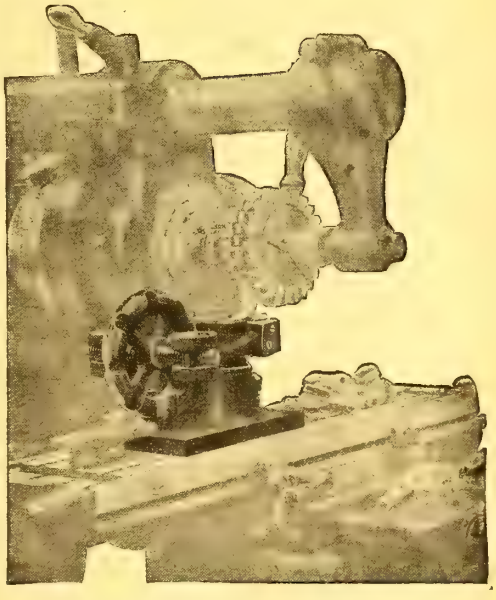


The BLACKBURN PATENT UNIVERSAL JIG for MILLING, TAPPING and DRILLING

Why waste time in making a Jig for each job ?

The Blackburn Universal Jig has been specially designed to meet emergencies which arise in milling, tapping and drilling. It is always ready, and secures accuracy and quicker output.

Half a turn of the hand-wheel releases the fitting.



Jig on a Milling Machine.

For Price and full Particulars, apply direct to the Manufacturers,
BLACKBURN AIRCRAFT PRODUCTS,
30, Norfolk Street, Strand, W.C. 2.

Blackburn AIRCRAFT

Steele's Ad. Serv.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

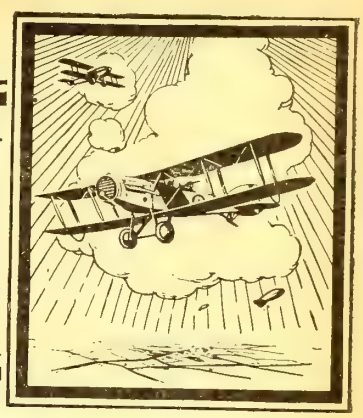
Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)



NAVAL & MILITARY AERONAUTICS



GEOFFREY WATSON

FROM THE "LONDON GAZETTE."

AIR MINISTRY, May 21st.

he following temp. appts. are made at the Air Ministry:—
T Officer, 1st Cl.—Lt.-Col. G. F. Pretyman, D.S.O., vice
. temp. Lt.-Col. P. C. Maltby, D.S.O., May 1st.
taff Officers, 2nd Cl.—And to be temp. Majs. while so
ld:—Lt. (temp. Capt.) F. C. Buck, April 25th; Capt. P.
. Gribble, May 4th.
taff Officers, 4th Cl.—C. S. Downey (temp. Lt., A.O.D.),
is granted a temp. commn. as Lt., April 12th; Lt. G.
vis-Russell-Balfour-Kinnear, April 20th.
he following temp. appts. are made:—Brig. Comdr.:—Lt.
(temp. Maj.-Gen.) C. A. H. Longcroft, D.S.O., and to be
p. Brig.-Gen. while so empld., April 29th.
:aff Officers, 1st Cl.—And to be temp. Lt.-Col. while so
ld.:—Lt. (temp. Capt.) M. Nicholson, April 7th; Capt. A. J.
d, M.C., May 15th.
aff Officer, 2nd Cl.—Maj. R. Money, April 7th.
LYING BRANCH.—Maj. C. H. Butler, D.S.O., D.S.C., and to
emp. Lt.-Col. while empld. as Lt.-Col. (Flying), seny. April
, May 8th.
o be temp. Majs. while empld. as Majs. (Flying):—Capt. E.
. W. Gilchrist, M.C., from a spec. appt., graded as Sqdn.
ıdr.: Capt. E. P. Plenty, while specially empld., May 6th;
t. J. O. Andrews, D.S.O., M.C.; Lt. (temp. Capt.) R. M.
rett; Capt. C. E. H. C. Macpherson, May 7th; Lt. (temp.
t.) F. G. Andreae, May 13th.
ts. to be temp. Capts. while empld. as Capts. (Flying):—
S. Goodliffe, April 10th; A. L. Cuffe, April 29th; R. L. Crof-
April 30th; F. S. Wilkins, May 3rd; F. T. Bright, May
; G. B. S. McBain, May 6th; (Hon. Capt.) R. R. Thornely,
.C., May 7th; A. C. Atkey, (temp. Capt.) G. G. Hubbard,
10th.
ts. (K.B.) to be Lts. (Flying):—T. C. Annan, April 8th; C.
Hawker, M.C., G. E. B. Pottinger, April 24th; C. K. Med-
April 29th; N. K. Brooks, May 4th.
t. (temp. Capt.) G. A. Cox reverts to Lt. (Flying) at his own
ıest, and relinquishes temp. rank of Capt., May 3rd.
ec. Lts. (Admin.) to be Sec. Lts. (A. and S.):—G. P. W.
ndler, R. Colloby, A. J. Garside, G. W. Graham, W. S.
ins, T. H. Mercer, J. R. Noble, J. H. Parry, W. V. Thomas,
G. Upton, April 1st; G. P. Addie, C. J. Allen, W. A. Arm-
ng, Wm. Campbell, C. F. Cogswell, F. Davidson, D. P.
d, C. E. Metcalf, S. M. Robins, D. Rose, G. D. V. Russell,
A. Seymour, L. Walsh, G. D. Wigley, April 2nd; J. Aitkin,
P. Bell, R. R. Bourner, W. J. Burns, H. P. Crabb, C. J.
ft, C. J. Lewin, M. S. Lewin, W. T. Morrison, C. Oldfield,
. Rae, April 3rd; J. F. Higgins, C. G. Holmes, G. M. G.
ın, R. Turner, April 4th; J. J. Birkenshaw, R. J. Brotherton,
Chesters, F. W. Ferguson, J. H. V. Latham, S. R. Norcott,
de V. Summers, S. T. Tipper, A. G. B. Whittaker, F. C.
ton, April 5th; H. G. Goddard, M. MacLean, R. S. Walter,
A. West, April 6th; C. H. Atkinson, A. Haines, H. L. Wood,
il 7th; F. A. Black, E. H. Bullen, G. F. Patch, April 8th.
he following are granted temp. commns. as Sec. Lts. (A. and
—W. B. Clarke, M.C. (Sec. Lt. R.G.A.), W. A. Coryton
, Rif. Brig., S.R.), and to be Hon. Lt., April 1st; F. S.
atwood (temp. Sec. Lt., attd. R. Suss. R.), C. B. Hayes,
. (temp. Lt.), R.E., and to be Hon. Lt., T. M. Wilkes, M.C.
ot. N.Z. Rif. Brig.), and to be Hon. Capt., April 2nd; F. G.
ck (Lt., C. Ont. R., C.E.F.), and to be Hon. Lt., F. S.
ley (temp. Sec. Lt., attd. W. Yorks R.), H. S. Stidston (Lt.,
k. R., C.E.F.), and to be Hon. Lt., April 3rd; C. F. Brown
ıp. Sec. Lt., attd. Durh. L.I.), R. Jones, M.C. (Lt., Man.
S. Res.), and to be Hon. Lt., R. Michaelis (temp. Lt., attd.
ool R.), and to be Hon. Lt., J. S. Shaw, (Lt. R. W. Fus.,
.), and to be Hon. Lt. (April 5th); M. H. Edmunds, May
t.
he following are granted temp. commns. as Sec. Lt. (Obsr.
cers):—L. E. Glover, D. H. Tachaner, May 11th.
. W. McA. Patterson (Hon. Lt. in Army) is granted a temp.
mn. as Sec. Lt. (Kite Balloon Officer), May 20th.

The following Cadets are granted temp. commn. as Sec. Lts (Kite Balloon). (Substituted for notification in "Gazette" of May 3rd):—E. J. A. Prosser, C. E. Taylor, W. Waddingham, April 3rd; C. H. Allen, E. S. Bale, H. C. S. Drake, J. S. Houston, W. C. Ingleby, A. A. Jackson, L. W. Killeen, L. J. Lawrence, H. W. T. Lewis, R. G. Maclean, J. McCormack, E. P. Nickless, J. L. Ure, W. E. G. Wallace, G. Wayman, A. L. Wright, April 8th; K. R. Bennis, W. R. H. Gateshill, H. D. Giblett, W. G. Hines, H. G. Johnston, C. G. Martin, J. T. McDougall, A. L. Muir, H. Plackett, G. R. Robinson, C. J. Sear, G. C. Shakespeare, W. G. Smith, K. M. Stewart, K. L. Vernon, S. T. Westcott, April 15th.

The following Cadets are granted temp. commns. as Sec. Lts. (A. and S.). (Substituted for notification in "Gazette" of May 7th):—A. J. Ashton, G. W. Axtell, H. V. David, C. D. Davis, P. T. Grant, J. H. Hampton, V. S. G. Hawkins, W. Riley, A. S. Underhill, April 17th.

The following Cadets are granted temp. commns. as Sec. Lts. (Obsr. Officers). (Substituted for notification in "Gazette" of May 7th):—C. Donald, H. R. Whitehead, E. G. Bugg, F. F. Schorn, D. L. Gould, C. Brooke, D. McN. Livingstone, F. D. McClinton, W. Bartley, April 23rd.

The following Cadets are granted temp. commns. as Sec. Lts. (Kite Balloon). (Substituted for notification in "Gazette" of May 7th):—R. M. Freshwater, P. J. O'Brien, April 12th; A. H. Allardyce, W. Blackhurst, W. J. Bocking, S. R. Bolton, T. Fairley, W. Knight, E. Simpson, E. T. Stead, April 29th; F Butler, R. Davies, G. Harrison, J. N. Holman, W. E. Jones, A. Low, F. J. W. Miles, J. L. Muir, R. P. Rodick, H. L. Shearer, G. K. Smith, F. Taylor, D. A. Watson, May 6th.

The following Lts. relinquish their commns. on account of ill-health, contracted on active service, and are granted the hon. rank of Lt.:—J. McN. Campbell, R. G. Fraser, S. C. Maytem, R. A. Pendry, J. D. E. Troop, May 22nd.

Lt. H. Stroud relinquishes his commn. on account of ill-health caused by wounds, and is granted the hon. rank of Lt., May 22nd.

The following relinquish their commns. on account of ill-health contracted on active service:—Lt. D. L. Macauley (Lt., Can. Local Forces), Lt. D. Mitchell (Lt., Sco. Rif., S.R.), May 22nd.

The following Lts. resign their commns. to resume their medical studies, and are granted the hon. rank of Lt.:—G. D. Fleming, G. M. Lewis, May 23rd.

The initials of Maj. T. F. Rutledge, M.C. are as now described, and not as in the "Gazette" of April 30th.

ADMINISTRATIVE BRANCH.—A. A. E. Robinson (Staff Paym., R.N.) is granted a temp. commn. as Maj., April 22nd.

To be temp. Majs. whilst empld. as Admin. Majs.:—Lt. (temp. Capt.) W. B. Cushion, May 6th; Lt. (temp. Capt.) S. A. Laird, May 10th.

H. de B. C. Garfit (temp. Capt. in Army) is granted a temp. commn. as Capt., May 11th.

T. Parker-Jervis (Lt., Gren. Gds.) is granted a temp. commn. as Lt. and to be temp. Capt. whilst empld. as Admin. Cap April 1st.

To be temp. Lts. whilst empld. as Admin. Lts.:—E. G. Brett (Sec. Lt., Tank Corps), and is granted a temp. commn. as Sec. Lt., April 1st; J. F. Kerr (Sec. Lt., Gen. List, New Armies), and is granted a temp. commn. as Sec. Lt., April 11th; Sec. Lt. R. G. Fussell, Sec. Lt. J. H. Lytle, April 26th; C. W. Banks (temp. Capt., Gen. List, New Armies), and is granted a temp. commn. as Lt. (Hon. Capt.), E. W. Bassil (Lt., Sussex Yeo., T.F.), and is granted a temp. commn. as Lt., May 8th; M. F. T. Cleaver, M.C. (Lt., R.F.A., S.R.), and is granted a temp. commn. as Lt., Sec. Lt. W. I. Prothero, May 13th.

The following are granted temp. commns. as Sec. Lts. (Admin.):—G. H. Carbutt (Midshipman, R.N.), April 1st; E. H. Cree, April 27th; A. B. Cocke, May 14th; R. J. Berry, L. R. Ellwood (Hon. Lt. in Army); A. R. Fulton, H. S. North, S. J. Stagg, S. C. McCully, May 20th.

The following are granted temp. commns. as Sec. Lts.:—U. B. Gilbert (Lt., R.G.A., S.R.), and to be Hon. Lt.; S. H. Alston (Capt., R. W. Kent R., T.F.), and to be Hon. Capt.; J. Graham

(Q.M. and Hon. Capt., Scots Rif.), and to be Hon. Capt.; W. Boning (Lt., Norf. R., T.F.), and to be Hon. Lt.; E. R. Brydges (Lt., Lab. Corps), and to be Hon. Lt.; T. A. Dick (Lt., R. Suss. R., T.F.), and to be Hon. Lt.; H. Foxwell (Lt., Fort Garry Horse, C.E.F.), and to be Hon. Lt.; T. A. M. Gardiner (Lt., Middx. R., S.R.), and to be Hon. Lt.; A. W. Hughes (temp. and actg. Lt. R.F.A.), and to be Hon. Lt.; H. Bridgewater (Sec. Lt., R.F.A., T.F.); H. Clarke (Sec. Lt., Norf. R.); C. E. Knight (Lt., E. Kent R., T.F.), and to be Hon. Lt.; H. G. Lynn (temp. Sec. Lt., Lab. Corps), April 4th; S. Waring (Lt., Leic. R.), and to be Hon. Lt.; M. C. Caley (Lt., Norf. R., T.F.), and to be Hon. Lt.; J. W. Sawyer (Lt., E. Yorks R., S.R.), and to be Hon. Lt.; F. Avison (Lt., Lanc. R., T.F.), and to be Hon. Lt.; G. P. Browne (temp. Sec. Lt., Norf. R.); M. R. Williams (temp. Sec. Lt., S.A., Lab. Corps); A. J. Coxon (temp. Sec. Lt., Lab. Corps), April 25th; Sec. Lt. A. J. Miller, April 26th.

A. J. Burge is granted a temp. commn. as Sec. Lt., May 20th.

W. H. G. Maton, M.B.E. (Qrmr. and Hon. Capt., R.A.), is granted a temp. commn. as Capt., April 24th

The following relinquish their commns. on ceasing to be empld.:—Lt. E. Edwards, Lt. (temp. Capt.) H. E. Pooley, April 18th.

The following Sec. Lts. relinquish their commns. on account of ill-health contracted on active service, and are granted the hon. rank of Sec. Lt.:—L. W. Bristo, E. M. Cook, J. M. Cullen, A. G. Knight, H. A. E. Moulder, D. A. E. S. Palmer-Stone, H. Pickford, May 22nd.

Sec. Lt. W. R. Gemmill relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lt., May 22nd.

Sec. Lt. R. C. Cleland-Hollamby (temp. Sec. Lt. R. W. Kent R., attd.) relinquishes his commn. on account of ill-health, May 22nd.

Sec. Lt. H. Walsh (Sec. Lt., R. Suss. R.) relinquishes his commn. on account of ill-health contracted on active service, May 22nd.

The following Sec. Lts. resign their commns.:—F. M. Magenais, J. S. McCalman, May 22nd.

Technical Branch.—Capt. (temp. Maj.) W. Wright to be temp. Lt.-Col. while empld. as Lt.-Col. (Tech.), May 1st.

Capt. T. Worswick to be temp. Maj. while empld. as Maj. (Tech.), April 19th.

Capt. S. A. Currin, from Staff Officer, to be Capt. (Tech.), April 1st (and relinquishes appt. of D.A.D.).

To be temp. Capts. while empld. as Capts. (Tech.):—Lt. W. H. Hoffert (substituted for notification in "Gazette," May 7th); Lt. W. Yonge, April 1st; J. Young (from Admin. Capt.), April 29th.

To be temp. Lts. while empld. as Lts. (Tech.):—J. H. Jennings (from A. and S., Lt.), April 1st; T. R. Mayhew (from O. Lt.), April 7th; Sec. Lt. D. H. Moore, May 9th.

The following is granted a temp. commn. as Sec. Lt. (Tech.):—H. G. Wheeler, May 14th.

Capt. L. H. M. Bennett relinquishes his commn. on ceasing to be empld., and is granted hon. rank of Capt., May 22nd.

Lt. A. E. S. Story relinquishes his commn. on account of ill-health contracted on active service, and is granted hon. rank of Lt., May 22nd.

Sec. Lt. R. P. Donaldson relinquishes his commn. on account of ill-health, and is granted hon. rank of Lt., May 22nd.

Sec. Lt. C. W. Gigg resigns his commn., May 22nd.

Medical Branch.—A. A. Bisset is granted a temp. commn. as Capt., April 12th.

G. H. Warner is granted a temp. commn. as Lt., May 20th.

Memoranda.—Lt.-Col. R. G. Talbot to be graded for purposes of pay as Staff Officer, 1st Cl., while empld. as Comdt., April 26th.

W. MacLanachan, late Lt., R.A.F., is granted hon. rank of Lt., May 22nd.

P. J. Webb, late Sec. Lt., is granted hon. rank of Sec. Lt., April 24th.

Sec. Lt. R. F. Ellis (Sec. Lt., Serv. Bn., R. W. Fus.) relinquishes his commn. on account of ill-health contracted on active service, May 22nd.

The notice in "Gazette" of May 10th does not include Warrant Officer Schoolmasters.

War Office, May 24th.

REGULAR FORCES. — Establishments.—R.F.C. — Mil. Wing.—Balloon Co. Comdr.—Graded as a Sqdn. Comdr.—Capt. F. X. Russell, R. Muns. Fus., from a Co. Comdr. (graded as a Flt. Comdr.), and to be temp. Maj. whilst so empld. (Jan. 21st).

Air Ministry, May 24th.

R.A.F.—The following appts. are made (April 1st):—

Deputy Director.—Maj. (temp. Lt.-Col.) A. D. Cunningham, and to be temp. Col. while so empld.

Staff Officers, 1st Cl.—And to be temp. Lt.-Cols. whilst so empld.:—Capt. (temp. Maj.) F. W. Lucas, Capt. (temp. Maj.) W. L. Marsh.

Staff Officers, 2nd Cl.—And to be temp. Majs. while so empld. if not already holding that rank:—Capt. (temp. Maj.) S. Flower, Lt. (Hon. Capt.) S. Nixon, Lt. (temp. Capt.) J. E. M. Pritchard, Capt. G. Whale, Maj. F. C. Williams.

Staff Officers, 3rd Cl.—And to be temp. Capts. while so empld. if not already holding that rank:—Capt. J. H. D. M. Campbell, Capt. P. L. R. Fraser, Lt. (temp. Capt.) T. E. Grant, Lt. (temp. Capt.) D. R. Parry-Jones, Lt. (temp. Capt.) J. A. C. Sumner, Lt. (temp. Capt.) J. E. Wain.

Staff Officer, 4th Cl.—Capt. E. E. W. Butt.

Flying Branch.—Lts. to be temp. Capts. while empld. as Capts. (Flying):—H. Haycock, V. D. Siddons, A. E. L. Skinner, May 3rd; A. Claydon, May 6th; J. Todd, May 7th; P. J. Clayson, May 8th; C. E. Williamson-Jones, May 13th.

Sec. Lts. (Admin.) to be Sec. Lts. (A. and S.):—J. G. Fleet, P. S. Gaster, C. R. R. Horton, April 15th; A. Chettle, A. E. Goodwin, E. E. A. Mills, R. Naylor, April 19th; J. H. Leniner, D. F. McColl, W. M. Tait, R. F. Caspareuthus, G. C. Matthews, H. E. Cardwell, D. McCarter, N. Wilson, J. McDonald, W. R. Pearson, G. Wignall, R. D. Hambrook, H. R. Hughes, F. J. Young, T. T. Warriner, J. S. Clark, J. H. Grahame, G. H. B. Smith, G. R. Wells, April 20th, A. E. Needham, E. V. Kennedy, C. R. MacNamara, J. B. Erskine, F. G. Goodes, F. T. Arnold, F. W. Scriver, G. T. Richardson, April 21st; A. J. Wilcox, E. Hall, J. Morton, S. Brierley, J. G. McDonald, G. Exley, H. K. Scrivener, S. E. Farson, P. H. Fowler, D. U. Thomas, R. C. Benson, T. Buckley, P. J. Cunningham, I. Holliday, J. McAuley, A. R. Melbourne, J. Whattam, R. C. Wickett, A. Wroot, J. Gannon, R. C. S. Hall, J. O. Smith, J. A. L. Champneys, A. Hindley, P. Boulton, J. B. Coutts, J. E. H. Littlewood, G. E. Richmond, F. Neale, J. G. Symons, April 22nd; K. F. Attwater, H. Oates, S. T. H. Roberts, E. E. Whitelock, F. C. P. Roberts, G. F. Holford, A. Duncan, J. M. Murray, H. C. Hagaman, A. D. Watson, C. Darbyshire, R. A. D. Jones, A. C. Masters, J. E. Walker, C. D. Clark, F. Shepherd, J. C. Fyfe, J. H. Guest, April 23rd; J. F. P. Kirsten, G. Travers, J. Morton, O. E. Frampton, C. F. Johnson, R. A. Boxhall, J. W. Marshall, C. Parker, C. E. Robinson, R. P. Smillie, J. M. Dunlop, A. W. Kite, G. Pickup, J. H. Dickson, E. Holder, K. S. Eagles, April 24th.

The following are granted temp. commns. as Sec. Lts. (A. and S.):—R. Walmsley (temp. Sec. Lt., Manch. R.), April 5th; E. Littlejohn (Sec. Lt., Norf. R.), April 10th; N. H. MacNeil, M.C. (temp. Lt., High. L.I.) and to be Hon. Lt.; J. MacFarlane (temp. Sec. Lt., attd. R. Highrs.), April 19th; C. R. Grace (Lt. Lovat's Scouts Yeo., T.F.) and to be Hon. Lt.; H. C. Beeston (Lt., Essex R., T.F.), and to be Hon. Lt.; H. E. A. Reynolds (temp. Sec. Lt., attd. Suff. R.); S. N. Hill (temp. Sec. Lt., attd. Middx. R.); C. E. F. Arthur (temp. Sec. Lt., attd. R. Fus.); A. C. Reeman (Sec. Lt., R.F.A. Spec. Res., April 20th; G. W. Evans (Sec. Lt., R.W. Fus., T.F.); B. E. Harmer (Sec. Lt., Suff. R., T.F.), April 21st; E. C. Crosse (temp. Lt., Norf. R.), and to be Hon. Lt.; W. N. Difford (Lt., Manitoba R., C.E.F.), and to be Hon. Lt.; Douglas (temp. Sec. Lt., R.G.A.); M. Adam (Sec. Lt., R. Sco. Fus., T.F.); J. G. Ward (temp. Sec. Lt., attd. Lan. Fus.); J. H. Nicholass (Sec. Lt., Bedf. R., T.F.); M. Forsyth (Sec. Lt., R.G.A., Spec. Res.); B. A. Bird (temp. Sec. Lt., attd., K.R.R.C.); P. C. Saxby (Sec. Lt., R.W. Kent R., T.F.); L. W. Strugnell (Sec. Lt., attd. Middx. R.), April 22nd; J. C. Alderton (temp. Lt., A.S.C.), and to be Hon. Lt.; H. T. Creighton (Lt., E. Ont. R., C.E.F.), and to be Hon. Lt.; K. M. Walker (Sec. Lt., Wilts R., Spec. Res.); H. C. Kibby (Sec. Lt., Middx. R., T.F.); P. B. Spivey (temp. Sec. Lt., attd. Middx. R.), April 23rd; R. J. Thompson (Sec. Lt. Gen. List); F. J. Haney, M.C. (temp. and actg. Capt., R.F.A. and to be Hon. Capt.; A. H. Belliveau (Lt., Can. For. Corps and to be Hon. Lt.; T. J. L. Ryan (Lt., C. Ont. R., C.E.F. and to be Hon. Lt.; R. Esterbrook (Lt., Lond. R., T.F.), to be Hon. Lt.; E. I. Dexter (temp. Lt., attd. Northd. Fus. and to be Hon. Lt.; C. M. Sankey, M.C. (Sec. Lt., E. Kent R.); W. Taylor (temp. Sec. Lt., attd. L'pool R.); J. H. Smith (Sec. Lt., Middx. R., T.F.), April 24th.

Comdt. W. N. Matthews is granted a temp. commn. as Sec. Lt. (Obsr. Officer), April 23rd.

Lt. H. J. Scudamore relinquishes his commn. on acct. of ill-health caused by wounds, April 10th.

Lt. W. Gray relinquishes his commn. on acct. of ill-health contracted on active service, April 11th.

The following Lts. relinquish their commns. on acct. of ill-health contracted on active service, and are granted the hon. rank of Lt.:—A. A. Lessard, J. McDougall, May 25th.

Lt. A. D. Purvis relinquishes his commn. on acct. of ill-health, and is granted the hon. rank of Lt., May 25th.

Lt. A. N. Maplestone relinquishes his commn. on acct. of ill-health caused by wounds, and is granted the hon. rank of Lt., May 25th.

Administrative Branch.—The following are granted temp. commns. as Sec. Lts., and to be Hon. Lts.:—H. J. Barnham (Temp. Qrmr. and Hon. Lt., Trg. Res.), April 25th; A. MacNab, M.C. (Lt., Arg. and Suthd. Highrs., T.F.), April 27th; C. E. Cox, M.C. (Lt., Middx. R., T.F.); M. Robinson (Lt., K.R.R.C., Spec. Res.), May 10th.

MANN EGERTON & Co.Ltd.

Contractors to the Admiralty, H.M. War Office, Etc.

ELECTRICAL

POWER AND LIGHTING

SPECIALISTS

ENGINES, DYNAMOS, MOTORS, SWITCHBOARDS, CABLES, LAMPS, ETC.

FOR MUNITION FACTORIES

SUPPLIED & ERECTED AT SHORTEST NOTICE.

MANN EGERTON & Co.Ltd.

177, CLEVELAND ST., LONDON, W.1.
ALSO AT NORWICH AND IPSWICH.

Lt. (temp. Capt.) A. N. C. Macklin resigns his commn, April 10th.

Lt. (temp. Capt.) C. E. Morgan relinquishes his commn. on acct. of ill-health contracted on active service, and is granted the hon. rank of Lt., May 25th.

Sec. Lt. H. A. Lyon relinquishes his commn. on acct. of ill-health and is granted the hon. rank of Sec. Lt., May 25th.

Sec. Lt. H. C. Appleby relinquishes his commn. on acct. of ill-health, and is granted the hon. rank of Sec. Lt., May 25th.

The following relinquish their commns. on acct. of ill-health :—Maj. Lord R. E. Innes-Ker (Maj., Ir. Gds., Spec. Res.), Lt. (temp. Capt.) G. Bell, Sec. Lt. H. C. Tully, May 25th.

Sec. Lt. G. F. Atkinson relinquishes his commn, May 25th.

Sec. Lt. S. A. Davis resigns his commn., May 25th.

Technical Branch.—To be temp. Lt.-Cols. while empld. as Lt.-Cols. (Tech.) :—Capt. (temp. Maj.) J. G. Bayes, Capt. J. D. Blyth, Lt. (temp. Capt.) L. B. Cook, Lt. (temp. Capt.) W. W. Farthing, Capt. (temp. Maj.) W. J. Fernie, May 10th.

Lt. J. Clinkskill to be temp. Capt. while empld. as Capt. (Tech.) April 23rd.

Sec. Lts. (Admin.) to be Sec. Lts. (Tech.) :—W. A. Payne, April 1st ; A. Dunderdale, April 6th ; D. A. Fowler, E. R. Wood, April 20th ; E. M. McCormack, April 22nd ; R. M. Adam, April 25th ; H. N. Munro, April 27th ; J. R. C. Hamilton, F. W. Martyn, H. P. Greenhill, C. Henderson, J. B. Martin, N. W. B. Bovey, J. N. Eastcott, W. T. Sharp, W. K. Yarnold, April 28th ; B. Thelenburg, May 1st.

Lts. (Flying) to be Sec. Lts. (Tech.) :—E. S. Dowdall, and to be Hon. Lt., April 1st ; R. S. Haward, and to be Hon. Lt., April 4th.

The follg. are granted temp. commns. as Sec. Lts. (Tech.) :—G. le M. Mander (temp. Lt., Gen. List), and to be Hon. Lt., A. S. Walker (Lt., N. Lanc. R., T.F.), and to be Hon. Lt., April 1st ; G. M. Bell (Sec. Lt., Norf. R., Spec. Res.), April 17th ; B. F. Harrison (Sec. Lt., R. Suss. R., T.F.), E. H. Walter (temp. Capt., R.F.A.), and to be Hon. Capt., J. R. Cassidy (temp. Capt., A.S.C.), and to be Hon. Capt., M. Proctor-Cregg (Lt., L. N. Lanc., S.R.), and to be Hon. Lt., F. P. Wills (Lt., Yorks L.I., T.F.), and to be Hon. Lt., A. Dingwall (temp. Lt., High. L.I.), and to be Hon. Lt., R. Drayton, M.C. (Lt., Dorset R. S.R.) and to be Hon. Lt., B. Hesketh (temp. Lt., R.E.), and to be Hon. Lt., J. B. MacGill (Lt., Lond. R., T.F.), and to be Hon. Lt., A. J. Newling (Lt., Lond. R., T.F.), and to be Hon. Lt., R. B. Stewart (Sec. Lt., R.F.A., Spec. Res.), C. L. Underwood (Sec. Lt., R.G.A., Spec. Res.), T. J. Fazackerly (temp. Sec. Lt., R. W. Fus.), F. Clarke (Sec. Lt., Res. R. of Cav.), H. C. Baker (Sec. Lt., R.G.A., Spec. Res.), A. Greenwood (Sec. Lt., R.F.A., Spec. Res.), L. Willment (temp. Sec. Lt., attd. Middx. R.), G. C. Kemp (Sec. Lt., Lond. R., T.F.), April 22nd ; L. H. P. Rees (Capt., R. W. Fus., Spec. Res.), and to be Hon. Capt., J. H. McCulloch (temp. Capt., R.E.), and to be Hon. Capt., G. B. Lockwood (temp. Qrmr. and Hon. Capt., Gen. List), and to be Hon. Capt., E. E. Hooper (Lt., Welsh R., Spec. Res.), and to be Hon. Lt., A. M. Reidy (temp. Lt., M.G.C.), and to be Hon. Lt., T. Bainbridge (temp. Sec. Lt., R.G.A.), April 28th ; A. R. Handcock (Lt., Surr. Yeo., T.F.), and to be Hon. Lt., May 1st.

Capt. E. R. Beney (Capt., Suff. R., T.F.) relinquishes his commn. on acct of ill-health contracted on active service, May 25th.

Sec. Lt. A. E. Walter relinquishes his commn. on acct. of ill-health, and is granted the hon. rank of Sec. Lt., May 25th.

War Office, May 27th.

REGULAR FORCES.—Establishments. — R.F.C. — Mil. Wing.—Flt. Comdr.—Temp. Lt. J. S. Dunkerley, Gen. List, from a Flying Officer, and to be temp. Capt. while so empld., Dec. 26th, 1917.

Equipt. Officers, 1st Cl.—From the 2nd Cl.—Sec. Lt. (temp. Lt.) F. D. Lugard, Spec. Res., and to be temp. Capt. while so empld., March 2nd.

Schools of Instrn.—School of Aeronautics.—Instr. (graded as an Equipt. Officer, 1st Cl.).—Temp. Lt. J. J. Gaynor, Gen. List, a Flying Officer (Obsr.), and to be temp. Capt. while so empld., Feb. 25th.

Asst. Instrs.—(Graded as Equipt. Officers, 3rd Cl.)—Temp. Sec. Lt. W. Dawson, Gen. List, a Flying Officer, Feb. 25th ; Lt. R. A. Carswell, Sco. Rif., T.F., a Flying Officer (Obsr.) ; Temp. Lt. F. W. Thomas, R.E., a Flying Officer (Obsr.), March 25th.

Sqdn. Comdrs.—(Graded for purposes of pay as Staff Capts.)—Capt. T. C. Rapp, M.C., W. Rid. R., T.F., and to be secd., Feb. 22nd ; Temp. Capt. H. B. de Montmorency, Bord. R., and to be transfd. to R.F.C. Gen. List, March 7th.

Royal Regiment of Artillery.—The following relinquish the actg. rank of Capt. :—On ceasing to be empld. as 2nd in Comd. of Anti-Aircraft Batts. :—Temp. Lt. A. Fittes, Dec. 7th, 1917 ; Temp. Lt. N. Wakefield, April 3rd.

FROM THE COURT CIRCULAR.

Buckingham Palace, May 24th.

The Lord Rothermere had an audience of The King this morning, upon relinquishing his appointment as Secretary of State for the Royal Air Force.

Buckingham Palace, May 25th.

The King held an Investiture in the Quadrangle of the Palace this morning.

The following officer was introduced into the presence of His Majesty, when the King invested him with the Insignia of

The Distinguished Service Order.—Lt.-Col. Richard Collie R.A.F.

The King then conferred the following decorations :—

A Bar to the Military Cross.—Lt. Sydney Jones, S. Lan R. and R.A.F.

The Military Cross and Bar.—Capt. Cecil Stevens, Duke Wellington's (W. Riding R.) and R.A.F.

The Military Cross.—Maj. Hector Robertson, R.A.F. ; Ca John Fox, R.A.F. ; Capt. Harry Rigby, R.A.F. ; Capt. Benjam Silly, R.A.F. ; Lt. William Aitchison, R.F.A., attd. R.A.F Lt. Jocelyn Bradford, Duke of Wellington's (W. Riding R.), att R.A.F. ; Lt. George Howsam, R.A.F. ; Lt. Stewart Roberts S. Lancs. R., attd. R.A.F. ; Sec. Lt. James Reeves, R.A.F.

OFFICIAL COMMUNIQUES.

NAVAL.

Admiralty Communiqués.

May 23rd.—During the period May 20th to May 22nd inclusiv Air Force contingents have carried out bombing operations agair Zeebrugge, the Mole, seaplane base, and enemy shipping in t vicinity, and also against Thourout and the enemy aerodrome St. Denis Westrem.

Two direct hits are reported on enemy torpedo-boat destroye with the result, according to photographic reconnaissance, th one destroyer has been sunk.

In addition, three enemy machines have been driven dov out of control.

All our machines returned safely.

May 27th.—During the period May 23rd to May 26th inclusi operations by Air Force contingents have been somewh hindered by unfavourable weather conditions.

Bombing operations have, however, been carried out agair Mariakerke (north-east of Ghent) and Zeebrugge, where bom were observed to fall close to the lock gates and car derivation.

Nearly three tons of bombs were also dropped on Brug Docks during the night of the 22nd-23rd.

All our machines returned safely.

In home waters, during the period, numerous flights in esco patrol, and other anti-submarine duties were carried out. Su marines were sighted and attacked, and enemy mines we located on several occasions. Our seaplanes have also carri out long reconnaissances over the North Sea.

On May 20th Allied aircraft made a successful bombing atta on the Austrian naval base of Cattaro (on the Adriatic). direct hit was obtained on the barracks, inhabited by submari crews, where a fire was seen to break out.

MILITARY.

G.H.Q. Communiqués.

May 21st, 10.45 p.m.—On the 20th inst. our observation b loons and aeroplanes were again very active. Several long-d tance reconnaissances were completed, many successful pho graphs were taken, and much observation work was done in operation with our artillery. During the day our bombing ae planes dropped a total weight of 22 tons of bombs on the enemy railway stations, aerodromes, and billets.

The enemy scout machines were chiefly employed in attacki our reconnaissance and bombing aeroplanes. In air fighting, German aeroplanes were brought down, and two others we driven down out of control. One hostile machine was shot do by anti-aircraft gunfire. Two hostile observation balloons we also destroyed by us.

Four of our aeroplanes are missing.

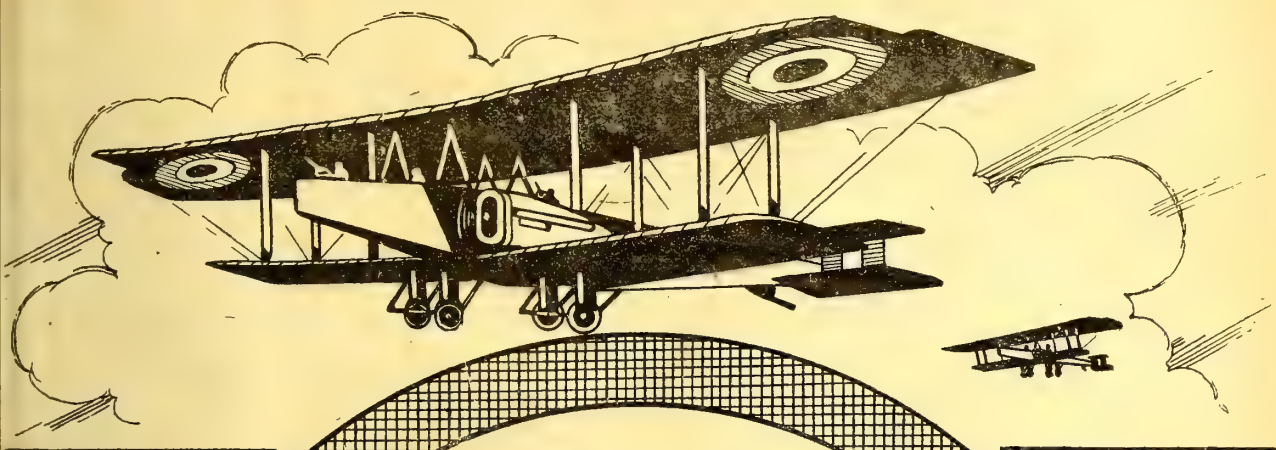
During the night the aerodromes in the neighbourhood Ghent, Tournai, and St. Quentin, used by the enemy's nig bombing machines, were heavily attacked. A total weight of tons of bombs was dropped on these targets. A further 4½ to of bombs were dropped by us on the railway stations at Thio ville, Metz and Coblenz, on the Rhine. At about 8 a.m. the 21st inst., 22 heavy bombs were dropped by our machines the railway stations at Namur and Charleroi.

One of our machines failed to return.

Since the commencement of the German offensive, exactly tw months ago, 1,000 German aeroplanes have been brought dow or driven down out of control by us, and more than 1,000 to of bombs have been dropped by us over the enemy's lines.

May 22nd, 9.45 p.m.—Reconnaissance and bombing by o aeroplanes and artillery and photographic work by our ae planes and balloons were continued uninterruptedly on the 2 inst. Some 1,200 bombs were dropped by us on various targe including four of the enemy's large aerodromes near Ghent a Tournai and billets in the neighbourhood of Armentière Bapaume, and Bray.

(*Continued on page* 2019.)



"I am returning herewith a pair of 'Triplex' Goggles, and shall be glad if you will kindly replace same for me .. I had a bad smash in a Nieuport Scout and **only for your goggles, should most certainly have lost an eye.**"

"You will be pleased to hear that **'Triplex' saved my eyes** from being badly cut, and will also be interested to learn that the **'Triplex' windscreen was unbroken,** though the immediate surroundings were battered."

100% Safety&Visibility

are the outstanding features of 'Triplex' Unsplinterable Safety Glass.

It has the unqualified approval of leading Aeronautical Engineers for Windshields, Observation Panels, Instrument and Map Covers, Goggles, etc.

Catalogue Mailed on Request.

The 'TRIPLEX' SAFETY GLASS CO., LTD.,
(REGINALD DELPECH, Managing Director),
1, ALBEMARLE ST., PICCADILLY, LONDON, W.1.

Telephone—Regent 1340.
Telegrams—"Shatterlys, Piccy, London."

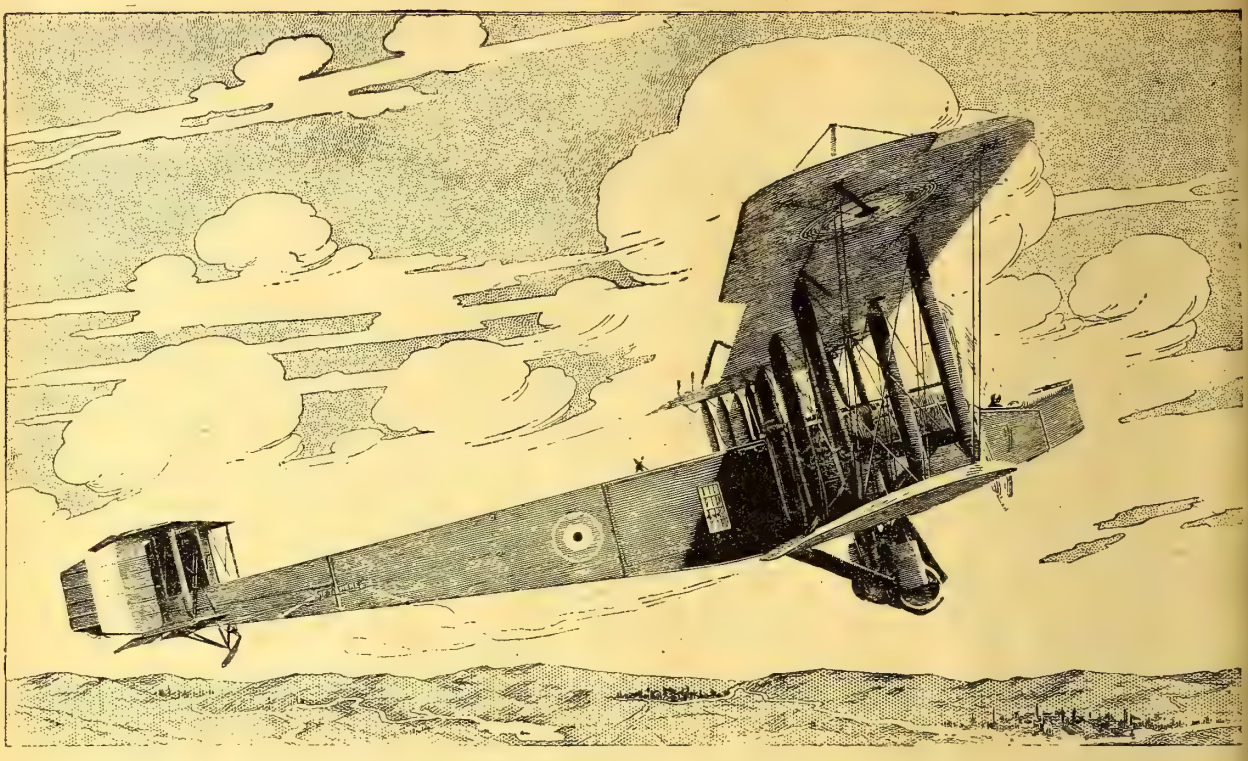
CONTRACTORS TO H.M. GOVERNMENT

"I am sending you to-day, under separate cover, a pair of **'Triplex' Goggles** which came to grief the day before yesterday. A small piece of shrapnel hit them. It is a good thing the Goggles happened to be **'Triplex'** or else it would have been a case of Nelson and one eye."

"There is no doubt **'Triplex' saved both my eyes,** as they would have been done for with any ordinary glass."

W.

'Triplex' Safety Glass



A Handley-Page Bombing Machine fitted with Sunbeam-Coatalen Aircraft Engines.

"THE work done by the SUNBEAM COMPANY during the war stands out very prominently, and when we review our commanding position in the air to-day we must not forget the debt owed to firms like the SUNBEAM for giving us such magnificent aerial engines.

Without a really good engine the best aeroplane is of little use, and we can have no better proof of the quality of the SUNBEAM-COATALEN ENGINE than to find it employed, amongst many other purposes, for use on the giant Handley-Page bombing machines. These great aeroplanes represent the highest achievements in big machines, and they call for the very finest engines."

"THE SPHERE," *April 27th, 1917.*

SUNBEAM-COATALEN AIRCRAFT MOTORS

THE SUNBEAM MOTOR CAR CO., LTD., WOLVERHAMPTON.

AERONAUTICAL ENGINEERING

SUPPLEMENT TO "THE AEROPLANE"

INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

THE 180 H.P. MERCEDES AERO ENGINE.

A Report issued by the Technical Department of the Department of Aircraft Production, Ministry of Munitions.

The following report on the design of the new 180-h.p. Mercédès engine is based on an examination of the engine (No. 35254) taken from the captured German Albatros biplane D.5.A. (G.97), which was shot down by anti-aircraft fire in a Brigade area on November 14th, 1917, and the accompanying data on the design of the engine and the particulars of its general performance, have been compiled from results of tests carried out at the Royal Aircraft Factory.

The 180-h.p. Mercédès engine is the first engine of a new type to be used in Service since the advent of the 260-h.p. Mercédès engines in the early part of last year. These 260-h.p. engines were apparently so successful that the 160-h.p. type have since been remodelled so as to introduce several of the leading features of the 260 h.p. practice. The result is seen in the 180-h.p. model, with which this report deals.

It necessarily follows from the above that this report will partake more or less of the character of a comparison between the 160-h.p. and 180-h.p. models. Frequent reference, therefore, is made in the text to the 160-h.p. engine, and in addition a table is given, showing the leading data of the two engines.

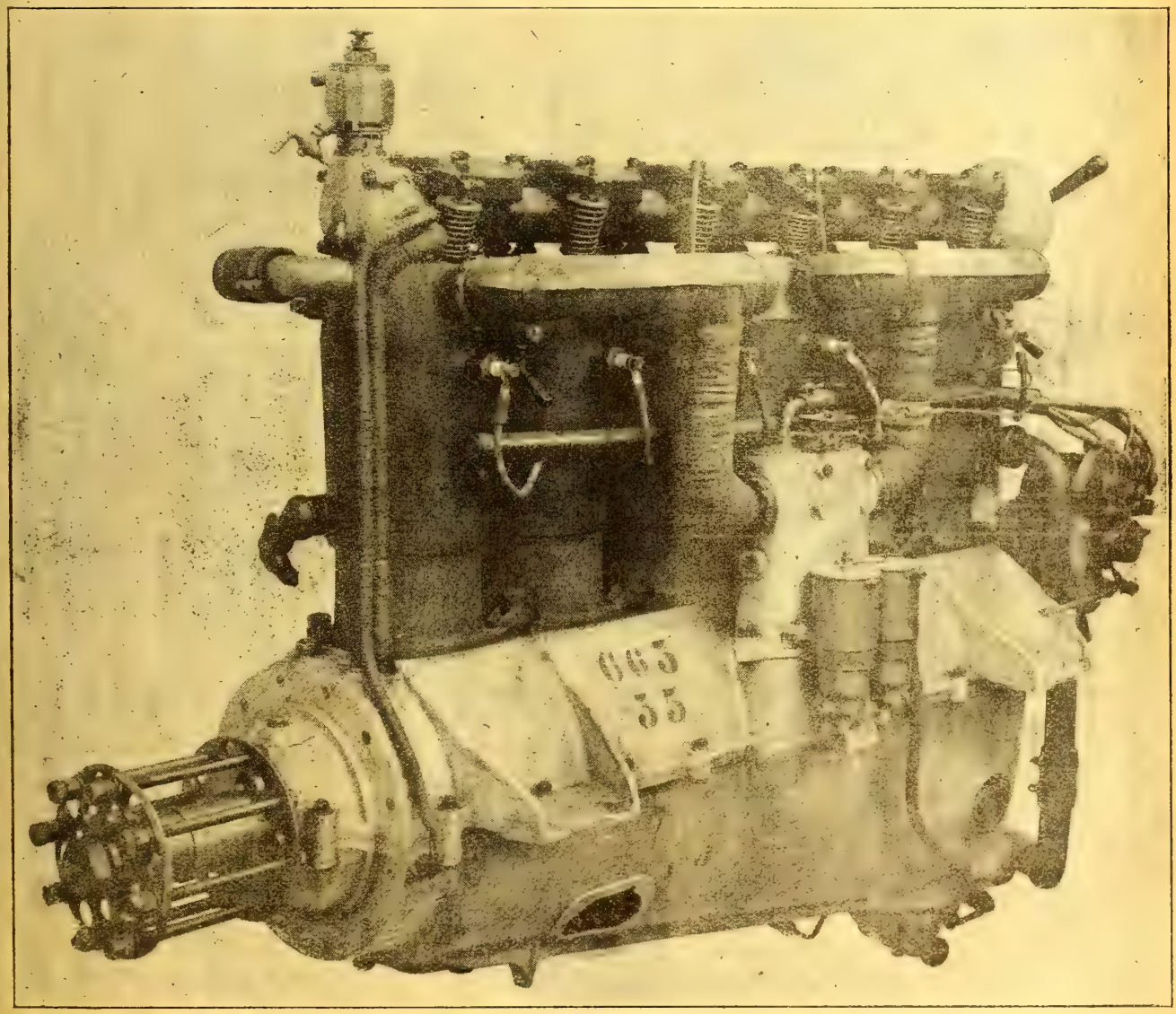


Fig. 1.—Inlet Side of the 180-h.p. High Compression Mercédès Engine.

In many respects the design of this new engine is similar to the 160 h.p. Mercédès, which is now obsolescent. The cylinders are of the same construction and of the same bore and stroke as the 160 h.p., i.e., 140 mm. × 160 mm., as also are most of the reciprocating parts; in fact, this engine might well be termed "The New 160-h.p. Mercédès."

Briefly described, the 180-h.p. Mercédès is a combination of the 160 h.p. and the new 260-h.p. Mercédès engines, and in view of this fact it will be unnecessary in this report to deal at length with the details of the design of those parts which are identical with the components of the above mentioned engines, of which fully detailed reports have already been issued, and the design of which is now well known in this country.

In comparison with the standard type 160-h.p. Mercédès, the new engine shows a marked improvement, both in the design as a whole and in its general performance during power and consumption tests, and as a comparison between the two engines the following comparative table of the leading particulars of the engines is herewith given :—

	160-h.p.	180-h.p.
Bore	140 mm.	140 mm.
Stroke	160 mm.	160 mm.
Compression ratio	4.50 :1	4.64 :1
Average B.H.P. and speed	162.5 at 1400	174 at 1400
B.M.E.P. (lbs. per sq. inch)	102.0 at 1400	109.1 at 1400
*Total weight of engine (dry)	618 lbs.	635 lbs.
Weight per B.H.P.	3.80 lbs.	3.65 lbs.
Fuel consumption per hour	94.2 pints.	94.83 pints.
Fuel consumption per B.H.P. hour	.58 pints.	.545 pints.
Oil consumption per hour	5.0 pints.	7.3 pints.
Oil consumption per B.H.P. hour	.031 pints.	.042 pints.
Inlet valve opens	2deg. L	T.D.C.
Inlet valve closes	35deg. L	40deg. L
Exhaust valve opens	63deg. E	40deg. E
Exhaust valve closes	13deg. L	10deg. L
Ignition timing (fully advanced)	30deg. E	30deg. E
Delivery of water pump		41.4 galls. per min

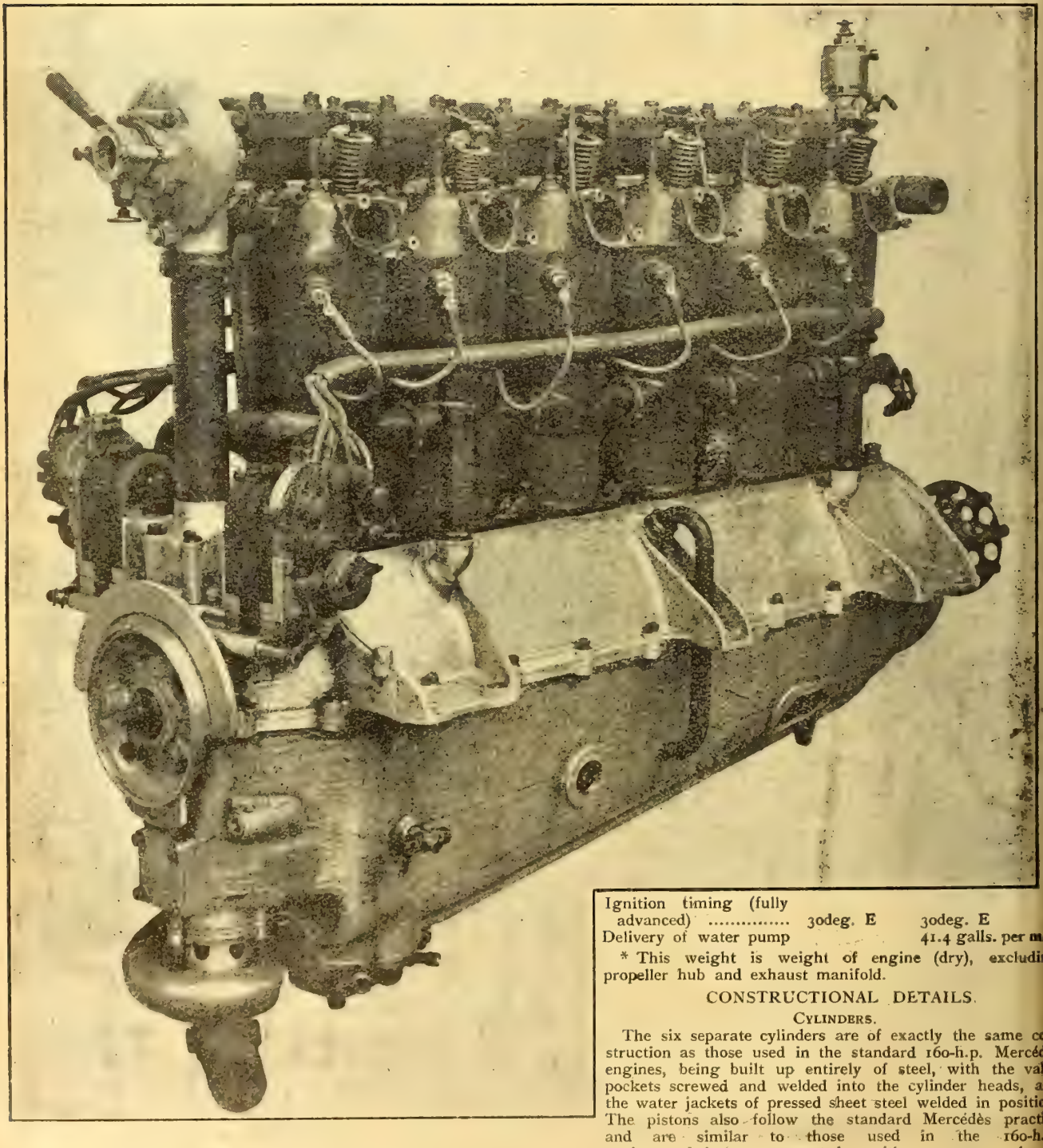


Fig. 2.—Exhaust Side of the 180-h.p. Mercédès.

* This weight is weight of engine (dry), excluding propeller hub and exhaust manifold.

CONSTRUCTIONAL DETAILS.

Cylinders.

The six separate cylinders are of exactly the same construction as those used in the standard 160-h.p. Mercédès engines, being built up entirely of steel, with the valve pockets screwed and welded into the cylinder heads, and the water jackets of pressed sheet steel welded in position. The pistons also follow the standard Mercédès practice and are similar to those used in the 160-h.p. engines being constructed with concave heads

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren Piccy, London."
" Phone—280 Gerrard

Also at

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

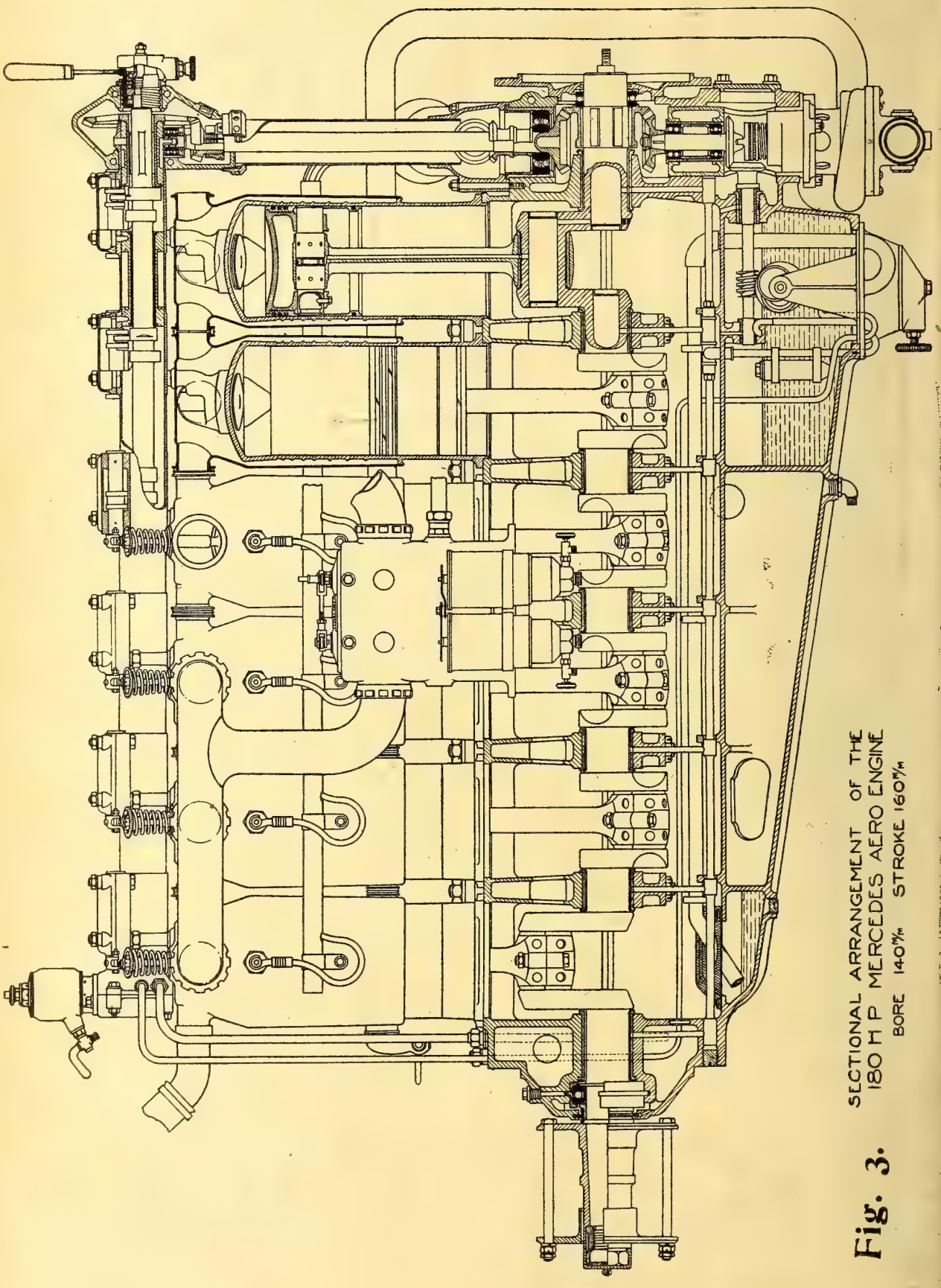


Fig. 3. SECTIONAL ARRANGEMENT OF THE 180 H P MERCEDES AERO ENGINE
BORE 140m/m STROKE 160m/m

ROLLS-ROYCE

Supremacy in the Air

Rolls-Royce Aero Engines
like
Rolls-Royce Cars
are the
Best in the World

"It is no flattery to state that whatever our superiority in the air may be, it is largely owing to the good fortune which led the authorities to select Rolls-Royce Engines for the most important aircraft." *"The Liverpool Courier," March 14, 1918.*

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

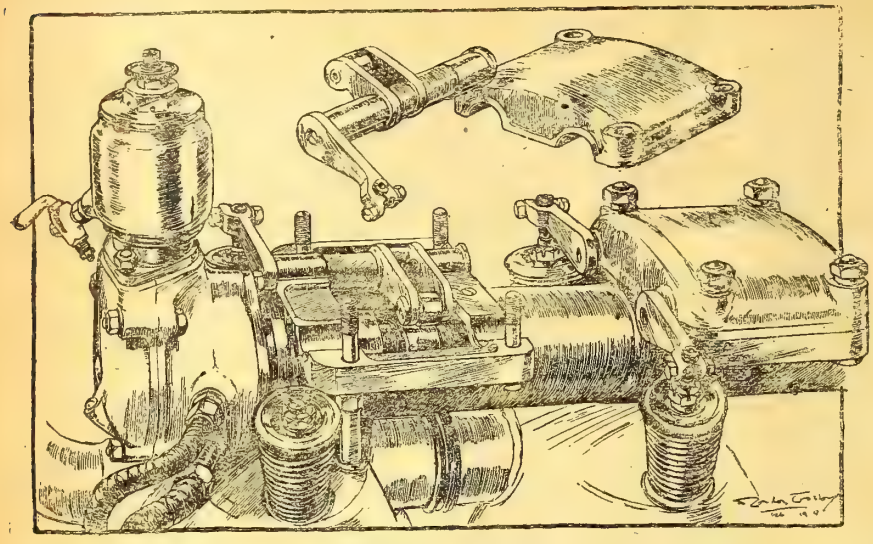


Fig. 4.—The Overhead Camshaft and New Valve Gear, showing Detachable Valve Pump.

machined from steel forgings, which are screwed into the cast iron skirts of the pistons and welded in position.

Three rings are provided above the gudgeon pins and one ring below which is situated at the base of the skirt. The gudgeon pins are carried in lugs machined in the lower part of the steel piston crown. The compression ratio it will be noticed is slightly higher in the new 180-h.p. engines, being 4.6 :1 as compared with 4.5 :1.

Connecting Rods.

The H section connecting rods with their floating cast iron gudgeon-pin bushes also follow the usual Mercédès practice and are identically the same as those used on the 160-h.p. engines, and the whole of the camshaft vertical driving shaft and also the water and oil pumps driving gear is similar to the 260-h.p. engines.

Crankshaft.

No alteration has been made to the general design of the crankshaft from the standard 160-h.p. type. The leading dimensions, clearances and method of lubrication of the journal and connecting rod bearing are the same, as shown in the general arrangement of the engine, Fig. 3, at end of report.

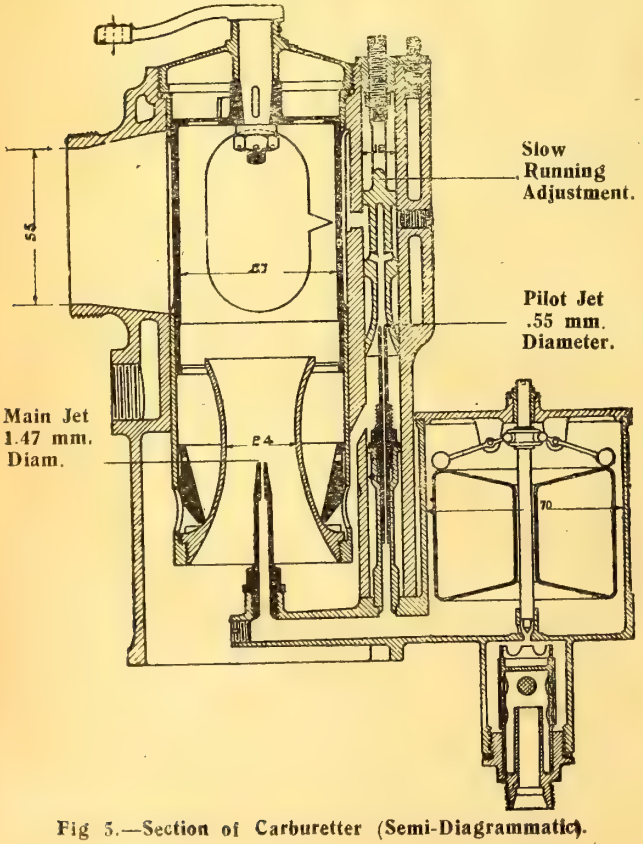


Fig 5.—Section of Carburetter (Semi-Diagrammatic).

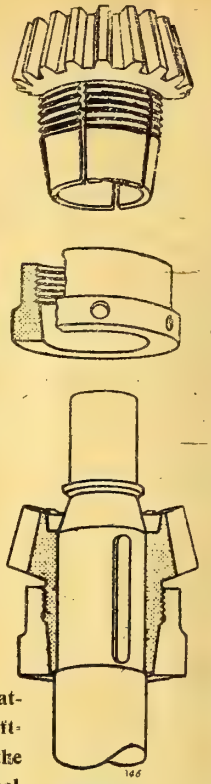


Fig. 6.—Method of attaching the Camshaft-driving pinion to the top-end of the vertical driving-shaft and the arrangement of the Skefko Twin race Ball-bearing on the bottom-end of the vertical shaft.

Crankcase.

The crankcase, whilst following the general construction of the 160-h.p. engines, also resembles in many ways the 260-h.p. type. The usual Mercédès practice of casting the lower half of the main bearing housings integral with the bottom half of the base chamber, and also the method of holding down the cylinders by long bolts which pass through the base chamber top half and secure the two halves of the crank-chamber, is adhered to.

Valve Gear.

The single inlet and exhaust valves of each cylinder, which work at an angle of 15 deg. to the central axis of the cylinder, are interchangeable as in the 160-h.p. engines and are of similar design; the valve operating gear is, however, of new design, and follows more the construction of the valve gear on the 260-h.p. Mercédès engines.

General details of this construction and working of the valve gear shown in the sketch, Fig. 4.

It will be noticed that the rocker arms and their spindles are now integral, being machined from steel forgings. The camshaft casing is constructed entirely from malleable-iron castings, and the valve rocker spindles work in direct contact with the malleable iron, no bronze bushes being provided as bearings for the rocker arm spindles, and the covers of the camshaft casing form the top portion of the rocker spindle bearings.

The rocker spindles are hollow, and are lubricated through two holes drilled radially in the spindles by oil thrown off the revolving cams into the two holes drilled in the rocker arm carrying the cam roller.

This design of valve gear is undoubtedly a great improvement on the arrangement adopted in the 160-h.p. Mercédès, the construction of which is well known, having the rocker arms working through slots in the camshaft casing, which are provided with felt-packing strips and baffle plates for retaining the oil in the camshaft casing.

Camshaft.

The camshaft is of similar design to the 160-h.p. Mercédès and the casing is supported on long studs which are screwed into the head of each cylinder.

With regard to the valve timing, this it will be noticed is different from the standard 160-h.p. Mercédès, as shown in the comparative list of leading particulars. The valve lift has been

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 5456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

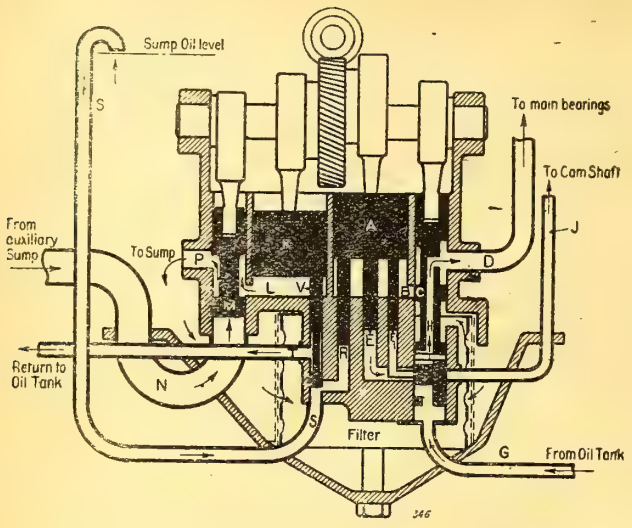


Fig. 7.—Diagrammatic Section of Oil Pump.

increased from 0.440in. on the 160-h.p. engines to 0.452in. Only very minor differences occur in the actual dimensional details of the half compression gear in the new engine. Details of this mechanism are now well known; the general design is, however, clearly shown in the general arrangement sectional drawing of the engine, **Fig. 3.**

Carburetters.

No alteration has been made in the design of the twin-jet dual carburetters. Both carburetters are enclosed in a cast aluminium water-jacket which is coupled at the bottom by a water-pipe to the delivery pipe of the water-pump and at the top to the water-jacket of the rear cylinder to the top portion of the water-jacket of the carburetters, as shown in Fig. 1.

Each carburetter feeds three cylinders through a branched induction pipe of steel tube, which is lagged with asbestos cord and bound with adhesive tape. The throttles are, of course, interconnected and are operated by a cable and also by a control lever and rod. The float chambers are of ordinary design, but are fitted with separate filters attached to the bottom of each float chamber, which are easily detachable. These filters are provided with needle-valve drain cocks. No compensating arrangement is provided for altitude control.

The bore of the main jets is 1.473 mm. and the bore of the pilot jets .558 mm., which is the same as in the 160-h.p. Mercédès carburetters. A semi-diagrammatic sectional view of one of these carburetters is reproduced in Fig. 5, for reference.

The air-intake to the carburetters is taken through the passage cast in the central portion of the top and bottom halves of the base-chamber, which forms an air chamber between the front and rear oil pumps in the lower portion of the bottom half of the base. Air enters the central air chamber through two holes cast in the sides of the chamber and also warm air through a large diameter pipe leading from the central portion of the top half of the crank-chamber.

Camshaft Drive.

The method of fixing the camshaft driving bevel at the top end of the vertical shaft, as shown in the sketch, Fig. 6, is unusual. This method is similar to that adopted in the 260-h.p. engines, and is so designed as to allow of a certain amount of vertical adjustment of the bevels. The driving end of the vertical shaft is machined and ground parallel, 21 mm. diameter, and is fitted with a key, which fits in a key-way in the driving bevel; a ground taper on the bottom extension of the bevel, which is split by four saw-cuts, and into which screws a ring nut, locks the bevel securely in position on the vertical driving-shaft.

In the old 160-h.p. Mercédès engines the camshaft driving bevel on the vertical shaft is fixed by two bolts in the split extension of the bevel which is fitted on to a ground taper on the vertical shaft.

Referring to the sketch of the vertical shaft, it will be seen that the bottom end of the shaft is carried on a "Skefko" universal bearing, which is mounted inside a steel sleeve, carried at the rear end of the crankcase, and is driven off the floating bevel gear on the rear end of the crankshaft in the usual way.

Lubrication.

The old 160 h.p. type multiple-plunger oil-pump has been replaced by the larger pump, similar in design to the 260-h.p. Mercédès pump. The oil pump is attached to the bottom of the rear oil sump or reservoir, at the rear end of the base chamber.

The functions of the oil-pump are perhaps most clearly demonstrated in the diagrammatic sectional drawing, Fig. 7, and in the sectional sketch of the pump, Fig. 8.

Briefly described, the functions of the oil-pump and the system of lubrication may be sub-divided into three circuits.

(a) The main pressure circuit, in which oil is drawn from the main oil sump at the rear of the base chamber and forced to the main crankshaft journal-bearings and connecting-rod bearings, and also to the camshaft bearings.

(*b*) The supplementary pressure system, which works in conjunction with the main high-pressure system, in which two auxiliary plungers of the main oil-pump draw a small charge of fresh oil from the service oil tank at every stroke of the pump and force the charge into the main circulation system.

(*c*) The suction or scavenger circuit, which supplies the main oil sump from the auxiliary drain sump at the front end of the base chamber, the working oil level being maintained in the rear sump by an auxiliary suction pump which draws off the oil above the oil level through an overflow pipe and returns it to the oil tank.

An oil sight level indicator is provided in the side of the rear oil sump.

Full details of the functions and operation of this somewhat complicated oil pump are given in the previous report on the 260-h.p. Mercédès engine.

Ignition.

Two Z.L.6 type Bosch magnetos are fitted at the rear end of the engine and are driven directly off the camshaft vertical driving-shaft by bevel gears, as in the 260-h.p. engines.

Ignition is by two Bosch 3-point plugs fitted to each cylinder one on either side of the cylinder below each valve head, and the H.T. cables are carried as usual in fibre tubes attached to the cylinders

The ignition timing is fixed at the same period as in the 160-h.p. engines, i.e., 30 deg. E., and the speed of the magnets is 1.5 times engine speed.

Firing order: 1, 5, 3, 6, 2, 4.

Water Circulation System.

The water-pump in the old type 160-h.p. Mercédès engines is situated above magneto drive, and is driven directly off the vertical camshaft driving-shaft. In the 180-h.p. engine the standard 260-h.p. type water-pump has been adopted. This is now driven, as in the larger engines, by a dog-clutch off the bottom end of the lower vertical shaft, which also drives the oil-pump worm driving-shaft, as shown in the sectional arrangement Fig. 3.

The water-pump spindle is provided with a spring-loaded fabric washer of steel in place of a gland, and the spindle is lubricated by hand, as in the 260-h.p. engines, by a large screw-down grease lubricator accessibly arranged on the pilot's seat. Details of this water-pump are clearly shown in the sketch, Fig.

The Air-Pump.

This is of new design, and is now driven off the front end of the camshaft, as in the 260-h.p. engines. The piston and bar

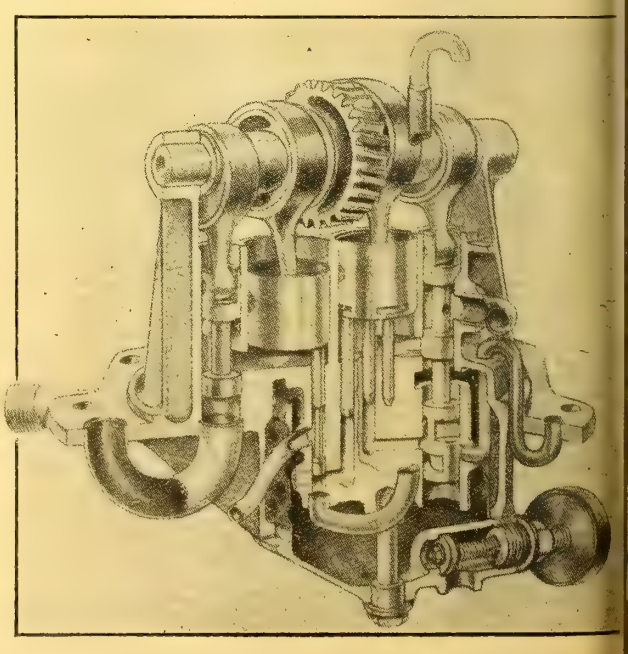


Fig. 8.—Sectional View of Oil Pump.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCED S, WEYBRIDGE."

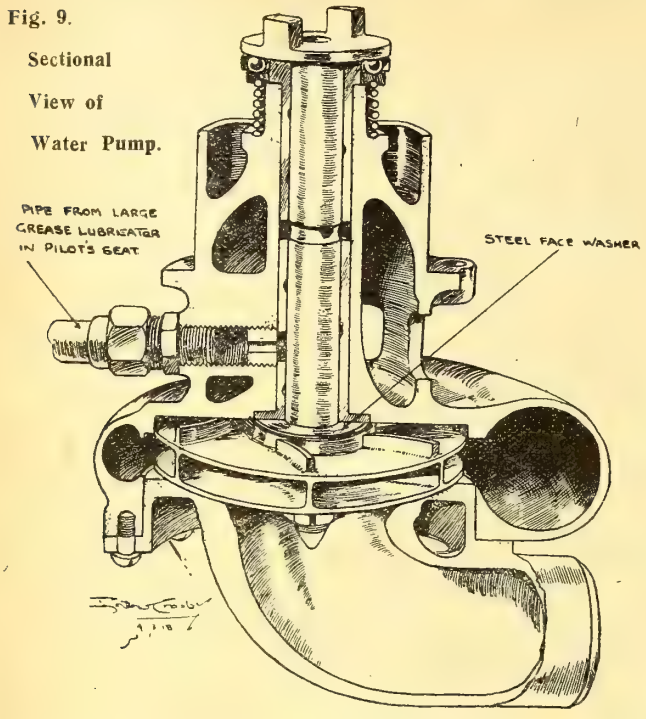


Fig. 9.

Sectional View of Water Pump.

of the air-pump are made of cast iron, and the piston is operated by a small connecting-rod of bronze and a double-webbed crank, as shown in the sectional sketch, Fig. 10. The air-pump crankshaft is provided with four serrations which fit into the corresponding splines cut on the inside of the hollow camshaft. The bore of the pump is 40 mm., and the stroke is 40 mm.

Air inlet ports are drilled in the lower portion of the pump-barrel, and are uncovered by the piston at the bottom of its stroke, and the delivery check-valve is situated in the head of the pump-barrel. A regulating valve is provided directly above the check-valve, the released air escaping through the centre of the hollow adjusting screw, and also through six small holes drilled radially in the screwed cap which forms the seating of the regulating valve.

A self-contained oil-trap is provided by the gun-metal jacket which surrounds the barrel of the air-pump. This is fitted with a drain cock, as shown in the sketch. The air-pump piston and crankshaft are lubricated by the excess oil in the camshaft casing.

The main oil-lead from the oil-pump to the hollow camshaft is taken through a passage drilled in the crank-chamber of the air-pump, the oil entering the camshaft through four 5 mm. holes drilled radially in the hollow air-pump crankshaft, which register with a groove cut in the inside of its bearing.

Sq. in. of piston area per B.H.P....	0.823 sq. in.
B.H.P. per cu. ft. of stroke volume	334.0
B.H.P. per sq. ft. of piston area....	175.0
Direction of rotation of crank and airscrew	Anti-clockwise facing airscrew.
Lubrication System	Forced, multiple plunger pumps
Oil consumption per hour	7.3 pints = 8.21 lbs.
Oil consumption per B.H.P. hour...	0.642 pint = 0.047 lb.
Oil pressure	20 lbs. sq. in.
Volume of oil carried in base chamber	17 pints.
Number and type of carburetters.....	One dual Mercédès, twin jet.
Diameter of chokes	0.945 in. = 24 mms.
Bore of main jets	0.058 in. = 1.472 mms.
Bore of pilot jets	0.022 in. = 0.559 mms.
Fuel consumption per hour	94.83 pints = 85.32 lbs.
Fuel consumption per B.H.P. hour	0.545 pint = 0.491 lb.
Inside diameter of induction pipes...	2.126 ins. = 54 mms.
Number and type of magnetos	Two, Bosch, Z.L.6.
Firing sequence of engine	1, 5, 3, 6, 2, 4.
Ignition timing (fully advanced)	30 deg. early.
Speed of magnetos	1.5 engine speed.
Inlet valve opens	Top dead centre.
Inlet valve closes	40 deg. late.
Diameter of inlet valve (smallest diam.) = d.	2.677 ins. = 68 mms.
Lift of inlet valve = h	0.453 in. = 11.5 mms.
Area of inlet valve opening (π.d.h.)...	3.81 sq ins. = 24.58 cms.
Mean gas velocity through inlet valve	153.4 ft. per sec.
Clearance of inlet tappet	0.017 in. = 0.432 mms.
Exhaust valve opens	40 deg. early.
Exhaust valve closes	10 deg. late.
Diameter of exhaust valve (smallest diam.) = d.	2.677 ins. = 68 mms.
Lift of exhaust valve = h.....	0.453 in. = 11.5 mms.
Area of exhaust valve opening (π.d.h.)	3.81 sq. ins. = 24.58 cms.
Clearance of exhaust tappet	0.014 in. = 0.355 mms.
Diameter of inlet and exhaust ports	2.165 ins. = 55 mms.
Diameter of water-pump inlet.....	1.692 in. = 43 mms.
Diameter of water-pump outlet	1.575 in. = 40 mms.
Ratio of water-pump speed to crankshaft speed	1.5 :1.
Delivery of water-pump at normal speed	41.4 gallons per min.
Inlet water temperature	64 deg. Cent.
Outlet water temperature.....	74 deg. Cent.
Water-jacket capacity of one cylinder	1280 cu. cms.

ENGINE DATA.

Number and arrangement of cylinders...	Six, vertical, separate.
Bore	140 mms. = 5.51 ins.
Stroke	160 mms. = 6.30 ins.
Stroke/bore ratio	1.142 :1.
Area of one piston...	23.84 sq. ins. = 153.9 sq. cms.
Total piston area of engine	143.04 sq. ins. = 924 sq. cms.
Stroke volume of one cylinder	150.28 cu. ins. = 2463 cu. cms.
Total stroke volume of engine	901.68 cu. ins. = 14778 cu. cms.
Volume of clearance space	41.3 cu. ins. = 676.64 cu. cms.
Compression ratio. Total volume / Clearance volume	4.64 :1.
Normal B.H.P. and speed	174 B.H.P. at 1400 r.p.m.
Piston speed	1470 ft. per min.
Brake mean pressure	109.1 lbs. sq. in.
Cu. ins. of stroke volume per B.H.P.	5.18 cu. ins.

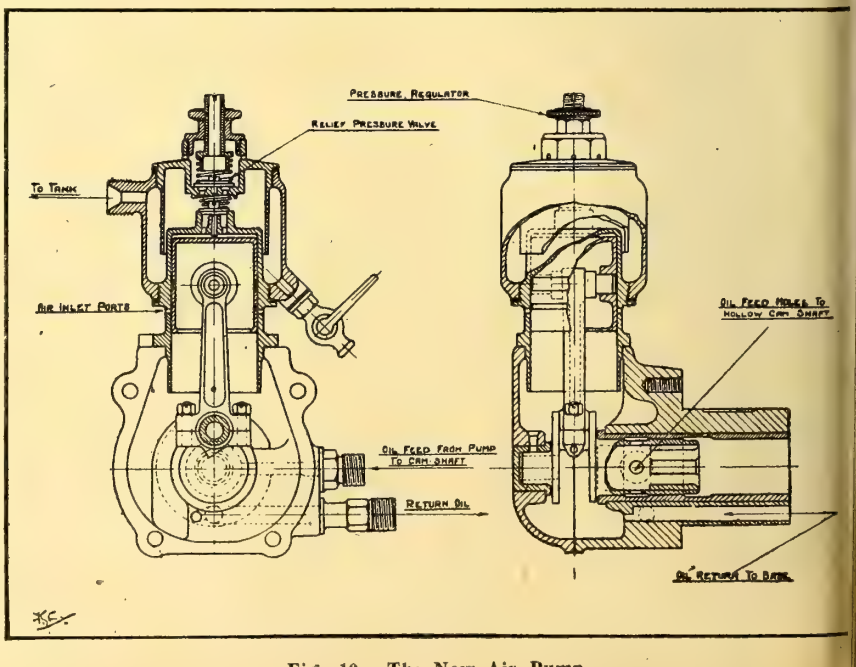


Fig. 10.—The New Air Pump.

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office

27, BUCKINGHAM GATE, S.W.1.

And at

HENDON, N.W.9.

General Analysis of Weights.

Description of Part.	No. per set.	Average unit weight.	Weight of complete set.	Percentage of total weight.
Cylinders (bare)	6	19.25	115.50	17.5
Pistons, complete with rings and gudgeon pins	6	6.85	41.10	6.23
Connecting rods, with gudgeon pin bushes	6	5.00	30.00	4.55
Valves, complete with springs, etc.	12	1.31	15.74	2.39
Crankshaft (bare)	1	70.00	70.00	10.60
Camshaft (bare)	1	7.75	7.75	1.17
Camshaft casing with bearings and covers	1	27.63	27.63	4.18
Valve rockers	12	.87	10.50	1.59
Half compression gear (complete)	1	7.00	7.00	1.06
Vertical driving shaft (complete, including casing, oil pump, drive, and floating bevel	1	17.50	17.50	2.66
Base chamber (top half)	1	72.25	72.25	10.92
Base chamber (bottom half)	1	100.00	100.00	15.16
Carburetters	one dual	16.75	16.75	2.54
Induction pipes (lagged asbestos)	2	5.00	10.00	1.52
Water pump (complete)	1	7.75	7.75	1.17
Oil pump (complete)	1	13.25	13.25	2.00
Air pump (complete)	1	4.75	4.75	.72
Magnetos (complete)	2	14.00	28.00	4.25
Water piping	—	3.25	3.25	.49
Propeller hub (complete)	1	12.50	12.50	1.90
Ignition wiring (complete)	2	2.00	4.00	.61
Exhaust manifold	1	13.00	13.00	1.97
Miscellaneous parts	—	31.78	31.78	4.82
Total weight of complete engine (dry) (with propeller hub and exhaust manifold)	660 lbs.			100.00

Weights.

Weight of engine complete, dry, including propeller hub and exhaust manifold	660.0 lbs.
Weight per B.H.P.	3.79 lbs
Weight of exhaust manifold	13.0 lbs.
Weight of oil carried in engine	19.125 lbs.
Weight of fuel and oil per hour	93.53 lbs.
Gross weight of engine in running order, less fuel, oil and tanks, but including cooling system at 0.65 lbs. per B.H.P.	773.0 lbs.
Weight per B.H.P.	4.44 lbs.
Gross weight of engine in running order, with fuel, oil and tanks for six hours. (Tanks at 10 per cent. weight of fuel and oil)	1390.3 lbs.
Weight per B.H.P.	8.00 lbs.

Test Report.

The following is a summary of a report on tests of the 180-h.p. Mercédès engine carried out at the Royal Aircraft Factory, February 6th, 1918.

The engine was erected on test-bed, and coupled to a Heenan and Froude dynamotor, and power readings taken at various speeds, simultaneous fuel and oil consumption readings being taken. The results of these tests are shown graphically on the curves reproduced on page 2012.

These curves show the following readings:—

R.P.M.	1300	1400	1500
B.H.P.	165	174	180
B.M.E.P.	112	109	105.5
Fuel consumption in pints per B.H.P. hour	.540	.545	.555

Normal engine speed ... ... 1400 r.p.m.
Average B.H.P. 174
Average petrol consumption ... .545 pints per B.H.P. hour.
Average oil consumption ... ... .042 pints per B.H.P. hour.

During a previous test, the engine was run up to 1,700 r.p.m., at which speed 197.5 B.H.P. was recorded, but at this speed the engine was found to be incapable of giving constant power.

The engine was run at 1,400 r.p.m. for the purpose of calibrating the output of the water pump, which delivered into a graduated tank at the rate of 41.4 gallons per minute.

Owing to the fact that during the above test it was found to be impossible to tune up the engine, the power developed does not probably represent its best performance, as from other data and tests of the engine a normal B.H.P. of 179.5 at 1,400 r.p.m. and a maximum B.H.P. of 188 at 1,500 r.p.m. has been recorded.

An interesting streamline radiator is fitted in the centre section of the top plane, details of which are being issued in a separate report on the Albatros biplane.

F. G. C.
27/2/18.

THE 240 H.P. (8 CYLINDER) MERCEDES.

Bore 140 m.m. Stroke 160 m.m.

The following detailed report on the design of the 8-cylinder Mercédès engine is based on an investigation of the engine (No. 23,003) taken from the German two-seater Albatros Biplane (G.37) which was brought down by anti-aircraft guns near Armentieres on the 12th of May, 1917.

This engine has been tested at the Royal Aircraft Factory and results of B.H.P. developed, petrol and oil consumption, etc., during tests are given herewith, together with details of the engine design and the leading particulars of the engine. Although this engine, according to reports, is now obsolete, the design having been abandoned in favour of the German standard six-cylinder vertical type, details and illustrations of the engine will no doubt prove of considerable interest, more particularly to those interested in the design of the special engines used for airship work.

In its general details this engine follows closely the design of the 160 H.P. Mercédès engines as regards the construction of the cylinders, pistons, valve gear, etc., and also in the lubrication system. It is therefore very similar to the 160 H.P. engine, with an extra pair of standard cylinders and a massive propeller shaft reduction gear, and the necessary alterations to the design of the crankshaft and the induction system, and in consequence of this similarity in detail to the 160 H.P. Mercedes, it will be unnecessary to deal at any length in this report with the design of those parts of the engine which are identical, a report on the former having already been issued, and the design being now well known in this country.

During calibration tests at the Royal Aircraft Factory, the engine showed a very good general performance, developing a maximum of 286 B.H.P. at 1,750 r.p.m. and an average of 242 B.H.P. at a normal crankshaft speed of 1,350 r.p.m.

Summary of Test.

Average petrol consumption per hour	141.3 pints.
Average petrol consumption per B.H.P. hour	.582 pints.
Average oil consumption	.042 pints/B.H.P. hour.
Oil temperature	37½°C.
Max. B.M.E.P. at 1,100 r.p.m.	120 lbs./sq. in.
Average B.M.E.P. at 1,350 r.p.m.	118 lbs./sq. in.
Compression ratio	4.73 :1.

Water pump delivery at normal engine revs. against a pressure of 2 lbs. per sq .in. = 91 galls./min.

The total weight of complete engine, dry including propeller hub and exhaust manifold = 900 lbs., equivalent to 3.72 lbs per B.H.P.

An attempt was made to throttle the engine below 900 r.p.m. but the running was irregular.

During a power and consumption run of 1 hour's duration an average of 267 B.H.P. was developed, at an average speed of 1,550 r.p.m., and at an average petrol consumption of 155 pints per hour = .582 pints per B.H.P. hour.

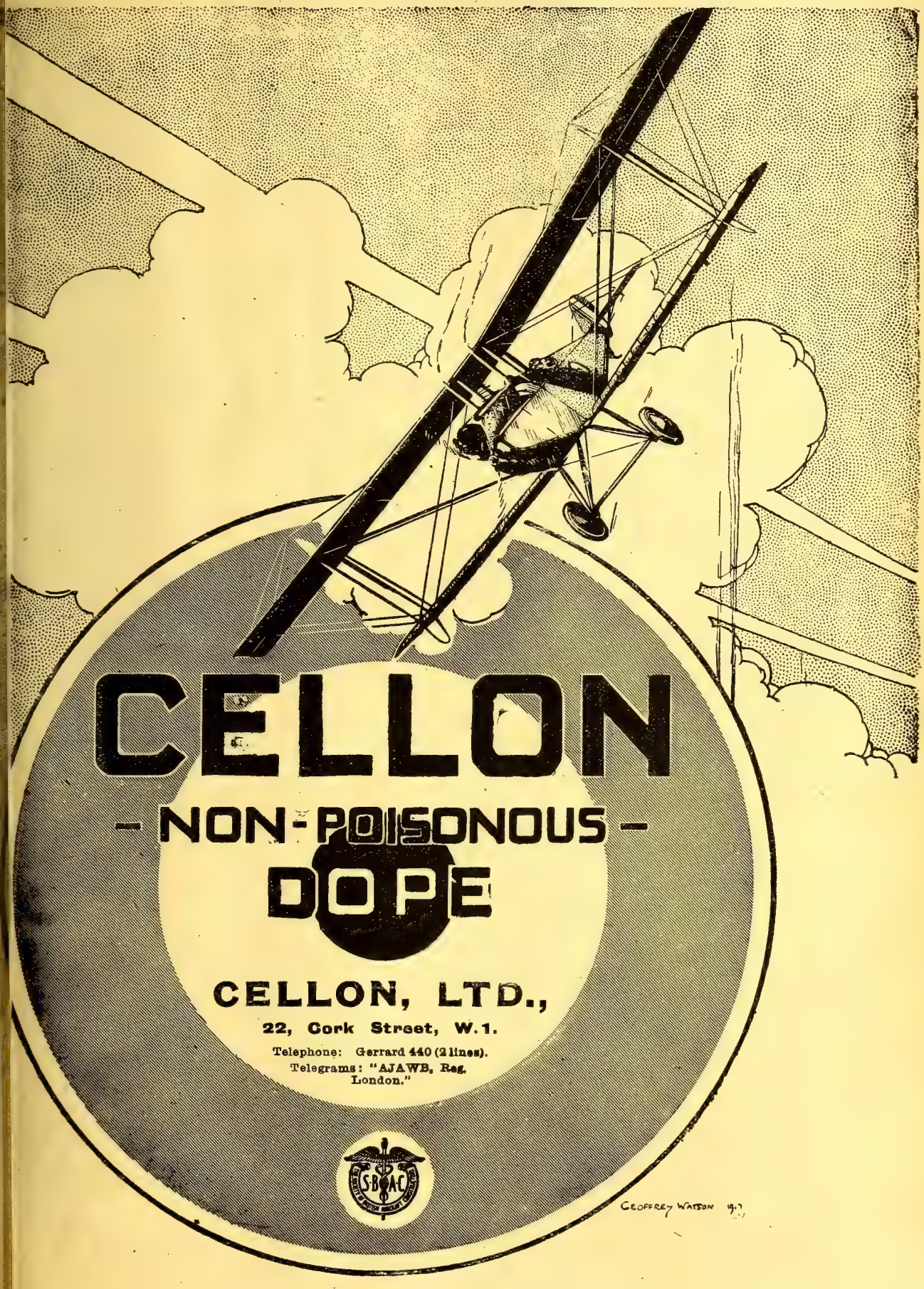
Oil consumption = 10.10 pints per hour = .042 pints per B.H.P hour.

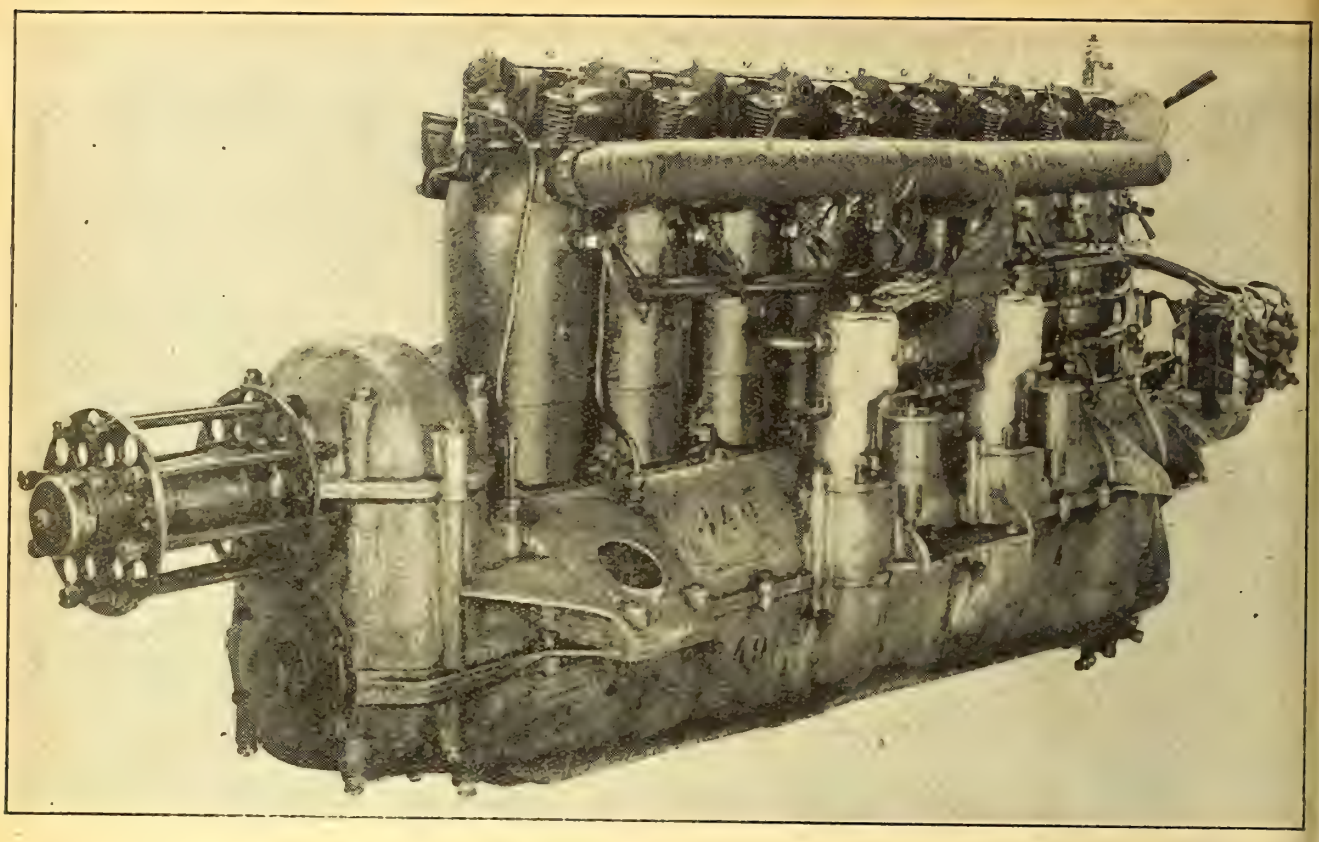
Water temperature, inlet = 65°C; outlet = 78°C.

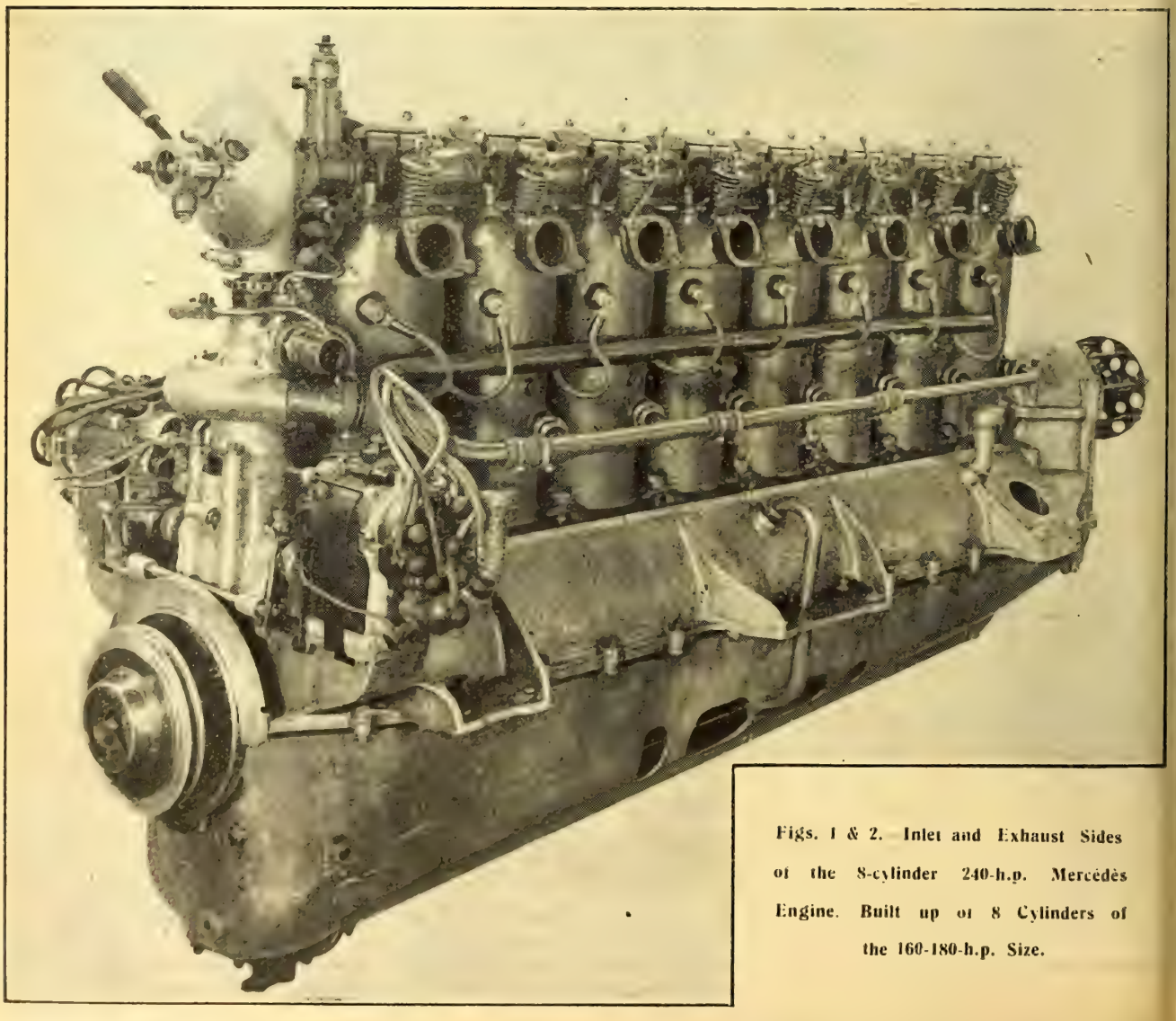
This test should not, however, be taken as representing the normal performance of the engine, as the average speed at which it was run, namely 1,550 r.p.m., is higher than that which would be obtained for any length of time in the air.

Details of Construction.

Cylinders.—These, as already stated, are of the standard 160 H.P. type, and are made entirely of steel, being built up of


CELLON
- NON-POISONOUS -
DOPE
CELLON, LTD.,
22, Cork Street, W.1.
Telephone: Gerrard 440 (2 lines).
Telegrams: "AJAWB, Reg, London."
SBAC
GEOFFREY WATSON

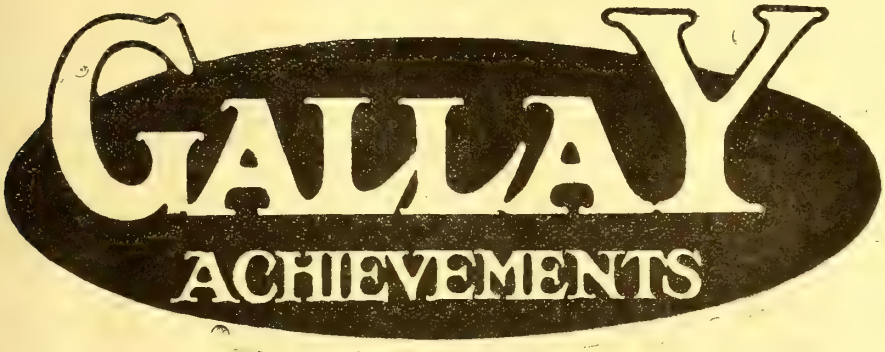




Figs. 1 & 2. Inlet and Exhaust Sides of the 8-cylinder 240-h.p. Mercédès Engine. Built up of 8 Cylinders of the 160-180-h.p. Size.

WE MANUFACTURE

RADIATORS : OIL COOLERS : COWLS : TANKS
MANIFOLDS : EXHAUST BOXES : SPINNINGS
AND AERONAUTICAL SUPPLIES OF ALL KINDS



We have delivered over

1,000
RADIATORS

during the last few months without a single rejection or complaint

These are the lightest, strongest and most efficient radiators ever made.

21lbs. to cool 200 h.p.

WE DELIVER TO AIR BOARD ALLOCATION

Our designers and experience are always at our customers' disposal.

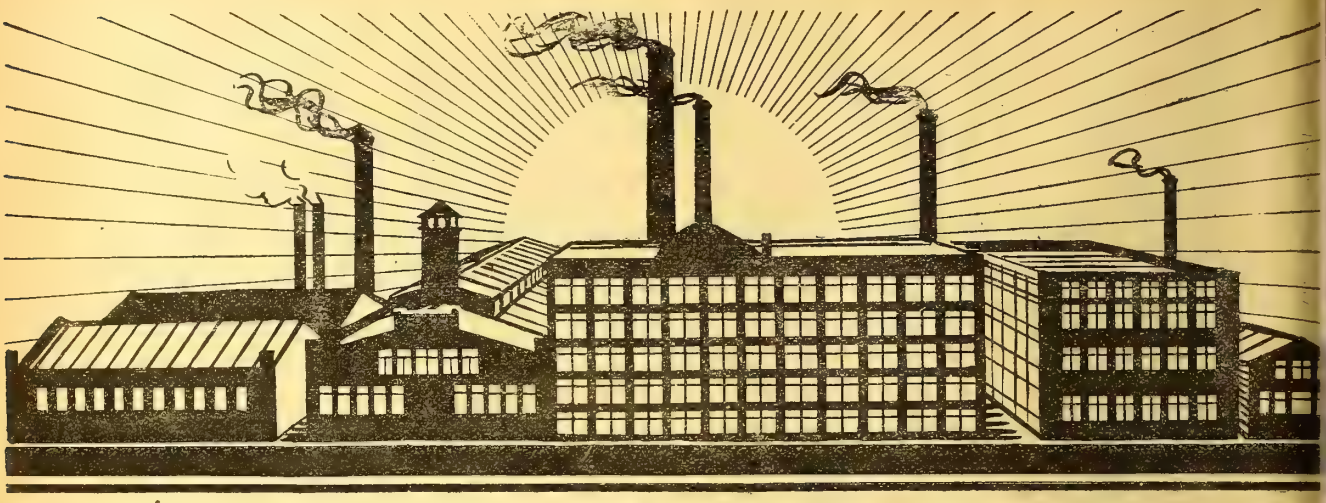
GALLAY RADIATOR CO., LTD.,

L. T. DELANEY, Managing Director.

198, Great Portland Street, London, W.1.

Telephone—4826 Mayfair. Telegrams—"Galyradico, Wesdo, London."

L.T.D.



The Sun doesn't send in a Bil

Daylight is FREE!

Use *more* daylight. Your lighting charges should not exceed one penny per day per employee. If your lighting costs you more, write for full particulars of the FAIRBY Daylight Method for new or old factories.

Remember this, walls are provided to keep the roof up and the heat in—*Not to keep the daylight out.* Let us show you how to cut down your lighting costs. Write NOW!

FAIRBY LIGHTING

FAIRBY CONSTRUCTION CO. Ltd.
317 High Holborn - LONDON - W.C.
'Phone: 1875 Holborn. Telegrams: "Bizzibild, London."

SELSDON

AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W.1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO, CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.

Telephones: DALSTON 872. LONDON WALL 9766. HAMPSTEAD 4768.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE MILL PLANTS AND TWO YEARS' EXPERIENCE.

OUR EIGHT SAW MILLS, WORKS, ETC.

Offices only: 141, CURTAIN ROAD, E.C.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

WYCOMBE AIRCRAFT CONSTRUCTORS, Limited.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

Heating & Ventilation
Installations
for
Factories
Dope Rooms
and all
requirements

ROSSER & RUSSELL Ltd
HEATING ENGINEERS
Manchester. House 37 Duke St, Oxford St W1.
and Cabinet Chambers Basinghall St. Leeds.

formerly at
22 Charing Cross
S.W.

Telephone
Mayfair 5210
Telegrams.
Lesorus Hammer London

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

ACCLES & POLLOCK, LIMITED.

MANUFACTURERS OF STEEL TUBING & PRESSWORK PARTS.

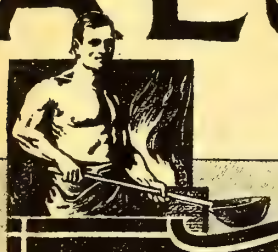
The Firm with the largest Aircraft experience in Tubular Components and Steel Presswork. Send us details of your requirements.

OLDBURY, BIRMINGHAM.

Telegrams: "Accles, Oldbury."
Code: A.B.C., 5th Edition.
Telephone: Oldbury 111 (4 Lines).

Trade Mark. ANKH *Means Long Life.*

ALUMINIUM CASTINGS





SAND or DIE
of Every Description
2 H·P to 600 H·P
CHILL CASTINGS for AEROPLANES A SPECIALITY
Best Metal. Good Castings. Quick Deliveries
Repairs to Aluminium Crank Cases, Gear Boxes etc. by Special Process

Telephones 3846 CITY 4879 CENTRAL

Telegrams "KRANKASES" ISLING LONDON

R·W·COAN

COAN CASTS CLEAN CRANK CASES

219, GOSWELL ROAD, LONDON, E·C

Contractor to H.M GOVERNMENT

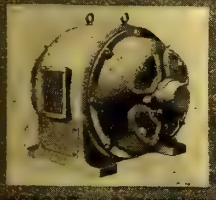
NOW IN A POSITION TO EXECUTE ORDERS.



CABLES



OVERHEAD LINES



MOTORS AND GENERATORS



SWITCHGEAR AND TRANSFORMERS

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E. 7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159W. George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.





The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3006.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 912.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Martinsyde, Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193.

Short Bros Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 1688 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London. Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Yeovil. "Aircraft, Yeovil" Yeovil 120.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378

Aluminium Castings (Sand and Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings—

Avenue 995, 996, and 7006.

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61.

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico, London, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1 Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10.

Cords, Tapes, and Threads—

MacLennan, T., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.

The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg. London." Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8026.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085.

The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevenfold, London" Walthamstow 408 (2 lines).

Electrical Accessories—

Belling & Co., Montague Road, Upp... monton, N.18. "Belling, Edmo... Tottenham

Johnson & Phillips, Ltd., Charlton, L... S.E.7. "Juno, London." Central 2207, London Wal...

Mann, Egerton & Co., Ltd., 177, Cl... Street, London, W.1. "Installing, road, London." Muse...

Premier Electric Heaters, Ltd., 258, 25... 360, Bradford Street, Birmingham. renheit, Birmingham." Midlan...

The Rotax Motor Accessories Co., Ltd... toria Road, Willesden Junction, N... "Rodynalite, Phone, London." Willesde...

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, try." Coventr...

Johnson & Phillips, Ltd., Charlton, L... S.E.7. "Juno, London." Central 2207, London Wal...

Electric Lighting and Pow...

E. Stanley Fardon, A.M.I.E.E., 67, Street, Manchester

Johnson & Phillips, Ltd., Charlton, L... S.E.7. "Juno, London." Central 2207, London Wal...

Electro Platers and M... Polishers' Engineers—

W. Canning & Co., 133-137, Great H... Street, Birmingham. "Materials mingham. Birmingham 3622 Central (3...

Enamel—

Silico Enamel Co., New Cross, Londo...

Flare Lights—

Imperial Light, Ltd., 123, Victoria Stree... don, S.W.1. "Edibrac, 'Phone, Lo... 3540 Victoria (3...

Flexible Shafts—

Herbert Terry & Sons, Ltd., Re... "Springs, Redditch." Reddi...

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbo... lage, Bournemouth. "Etches, Wint... Bournemouth

Cambridge School of Flying and Aerodro... 308, St. Andrews St., Cambridge. bon, Cambridge." Cambridge 5 an...

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pa... House, London, E.C.2. London Wall 573 an...

Galvanising—

Boulton & Paul, Ltd., Rose Lane, N... "Aviation, Norwich." Norwi...

Gauges—

J. A. Prestwich & Co., Northumberland Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Birmingham. "Mosgear, Birmingh... Ea...

Glue—

Cannon, B., & Co., Ltd., Lincoln. Office, 110, Cannon Street, "Bececolin, Cannon, London." Ci...

Improved Liquid Glues Co., Ltd., Gt... tage Street, E. (Croid.). "Exc... Wapp, London." Avenue

Mendine Co., 8, Arthur Street, E.C. Ban...

Oldroyd, Wm., & Sons, Ltd., 9, Mincing...

Goggles—

Triplex Safety Glass Co., Ltd., 1, Alb... Street, Piccadilly, W.1. "Shafterlys, London." Regen...

Hack Saw Blades Machines—

Victor Saw Works, Ltd., 2 and 3... Street, Finsbury Circus, London, Vicsaw, Phone, London." London Wal...

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65... Southwark Street, London, S.E.1. "K... Hop 372 (2...

Sturtevant Engineering Co., Ltd., 147... Victoria Street, London, E.C.4. tevant, London." Central 7121 (6...

Hollow Spars—

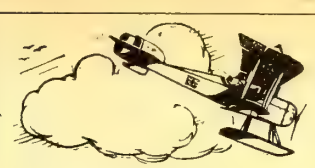
McGruer Bentwood Hollow Spar Co... mercial Wharf, Lambeth, S.E. "C... son, Watloo, London." H...

Robert Young's Construction Co., Ltd., bury Street, Essex Road, London,

Instruments—

British Wright Co., Ltd., 33, Chancery... W.C.2. Holborn

· Buyers' · Guide.



struments (Scientific, Altimeters, etc.)—

The Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 642.

Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

agneto Driving Pieces—

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61

agnetos—

The M-L Magneto Syndicate, Ltd., Coventry. "Corlton, Coventry." Coventry 1008-1009.

The British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicksmag, Phone, London." Museum 430

The British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

tal Manufacturers—

Clifford, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham." Central 42-43.

tals in General—

Avenue 1432

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 905, 906, and 7006

Samuel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

tal Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Aeroplane General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppiskout, Holborn, London." Holborn 4959.

Aircraft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 Upcast, Rand, London" Gerrard 276 (2 lines).

Arnott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2207.

Bayliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

British Metal (Kingston), Ltd., Kingston-on Thames

Guthrie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Lombard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

Mann, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston road, London." Museum 70.

Mountford, Fredk., Lt., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261.

Robertson, J. H., & Co., 1, Albemarle Street, London, W.1. Regent 3006.

Rubery, Owen, & Co., Darlaston South Staffs.

Sankey, Joseph, & Sons, Ltd., Wellington Shropshire. "Sankey, Wellington, Salop." Wellington 77

The Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Thompson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

Vooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

tal Shearing Tools—

Montgomery, Smith & Co., Ltd., Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

tal Spinnings—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

tric Bolts—

Cashmore Bros., Hildreth Street, Balham, S.W. Battersea 415.

Rubery Owen & Co., Darlaston, South Staffs.

scellaneous—

Anderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

Bowden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

British Metal (Kingston), Ltd., Kingston-on-Thames.

Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.

Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston road, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy,

Parachutes—

London." Regent 1340.

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 723.

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 201, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26.

Radiators—

Gallay Radiator Co., Ltd., 108, Great Portland Street, W.1. "Galyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay, 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—

Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo. & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Timber—

Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 1526.

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hopton, Euscare, London." Museum 406.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 80a, Borough High Street, S.E.1. "Buceron, London." Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.



The Aeroplane Buyers' Guide.



Acceptance and Experimental Flights—
The Prodger Issue Aviation Co. "Ieromnia, Piccy, London Gerrard 278 (2 lines)

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Ediface, Phone, London" 3540 Victoria (3 lines)

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London" Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhill 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol "Aviatic, Bristol." Bristol 308
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2 "Caudron, Cricklewood, London" Hampstead 2420
Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4493 and 4494
Davidson Aviation Co., Ltd. Bournemouth W.S. Hammersmith 1092 (3 lines)
Dawson, John, & Co. Ltd., Newcastle-on-Tyne "Dependable, Newcastle-on-Tyne" Central 1805 (2 lines)
Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne" Eastbourne 1178
Grahame-White Aviation Co., Ltd., Hendon Aerodrome, Hendon. "Volplane, Hyde, London" Kingsbury 120
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London" Hampstead 2420
Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London" Regent 1082
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich." Norwich 382 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet "Martinsyde, Westrodge, Byfleet" Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston Museum 3373.
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2 "Nieucourt Crickle, London" Willesden 2455
Norman-Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 48
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodie London" Putney 2240-2241
Roe, A. V., & Co., Ltd., Manchester "Triplane, Manchester" City 8530 8531, Manchester
Saunders, S. E., Ltd., Rew Cowes, I.O.W. "Consuta, Rew Cowes" Cowes 191
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378
Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith Kingston" Kingston 1088 (8 lines)
Standard Aircraft Manufacturing Co., 58, Bow Common Lane, E. East 2843
Vickers, Ltd., Imperial Court, Bow Street, Knightsbridge, S.W. "Vickerdom, Knights, London" Kensington 1860
Waring & Gillow, Ltd., Hammersmith "Waring, Or, London" Museum 5000
Westland Aircraft, Yeovil "Aircraft, Yeovil" Yeovil 170
White & Thomas, Ltd., Fleet, Cowes "White Fleet, Cowes" Cowes 3
Whitehead Aircraft, Ltd., Richmond, Surrey "Whitecraft, Richmond, Surrey" Richmond 1865
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84

Airships—
Airships, Ltd., High Street, Merton Wimbledon 1314
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378

Aluminium Castings (Sand and Die)
Cozo, R. W., 216, Gosswell Road, London, E.C.1. "Rookcases, Islng, London" City 3846

Bent Timber Parts—
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euston, London" Museum 396
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor-Bronze)
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetrs, Fen, London" Avenue 693, 696 and 7006

Buildings—
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich" Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1315
Rubery, Owen & Co., Darlaston, South Staffs
The Willsley Co., Ltd., Salisbury House, London Wall, E.C.2 "Wrathless, Phone, London" City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Carburettors—
Holson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4670

Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Suricoid, Fen, London" Avenue 34 and 35.

Celluloid (Non-Flam.)—
Greenhill & Sons, 8 Water Lane, E.C. "Greenhill, London" Central 1306-7

Clothing—
Burberrys, Ltd., Haymarket, S.W.1 Regent 2165
Dreadl, Ltd., Euston Road, N.W.1. "Dunsend, London" North 3405-6

Coloured Rags—
Joseph, A., Earl Street, London Road, Southwark, S.E.1. "Joe, Mongo Street, London" Hop 83, 3911, 4272.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)
Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London" Hampstead 4493 and 4494
PDV Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond" Richmond 1681

Furniture (Office)—
Cooke's (Bradford), Ltd., Bradley, Bilston, England "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—
Maclennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. City 3115

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1 "Tetraflee, Picc, London."
Cerecloth, Ltd., Cowes "Cerecloth, Cowes" Cowes 191
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulose, London" Regent 4940
The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Picc, London" Gerrard 280
Cellon, Ltd., 22, Cork Street, London, W.1. "Ajaxh, Reg, London" Gerrard 440.
Clark, Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Perkins, Westrand, London" Regent 3923

Engines and Parts—
Allen, W. H., & Co., Ltd., Bedford "Pump, Bedford" Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-282
The Beaufort School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000
Bedford, Vero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1. "Aeroflight, Vic, London" Vic 7028
Gordon Waines & Co., Ltd., Westbridge "Mercedes, Westbridge" Westbridge 550 (7 lines)
Green Engine Co., Ltd., Twickenham
Gwynnes, Ltd., Hammersmith, W.6. "Gwynne, Hammersmith" Hammersmith 1010
Napier & Son, Ltd., 14, New Bond Street, London, W., and at Acton, W. "Sprinkler, London" Gerrard 8026.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolls, London" Gerrard 1623 5-6
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 085
The Gnôme & Le Rhône Engine Co., Ltd., 27, Victoria Street, S.W. "Clerimont, London" Walthamstow 308 (2 lines)

Electrical Accessories—
Belling & Co., Montague [illegible], Edmonton, N.18
Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London" Central 2207, London
Mann, Egerton & Co., Ltd., Norwich Road, Lakenham, Norwich
Premier Electric Heaters, Ltd., 360, Bradford Street, Birmingham
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodsnaplite, Phone, London" Willesden 2480

Electric Cables—
E. Kalker & Co., Coventry, Ltd.
Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London" Central 2207, London

Electric Lighting and Power—
E. Stanley Jordan, 3, Queen Victoria Street, Mansion House, E.C.4. "Electrolier, London"
Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London" Central 2207, London

Electro Platers and Polishers' Engineers—
W. Canning & Co., 133-35, Great Charles Street, Birmingham. "Plating, Birmingham" Birmingham 3622 Central

Enamel—
Silico Enamel Co., New Cross, London

Flare Lights—
Improved Light, Ltd., 123, Victoria Road, Rosebery Avenue, S.W.1. "Ediface, Phone, London" 3540 Victoria (3 lines)

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch"

Flying Schools—
Bournemouth Aviation Co., Ltd., Hamworthy, Dorset "Flying, Bournemouth" Hamworthy 308
Cambridge School of Flying, Aeroplane, 308, St. Andrews St., Cambridge "Cambridge, Cambridge" Cambridge
PDV Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond" Richmond 1681

Furniture (Office)—
Cooke's (Bradford), Ltd., Bradley, Bilston, England "Thompson Bros., Bilston" Bilston 10

Galvanising—
Boulton & Paul, Ltd., Rose Lane, Norwich "Aviation, Norwich" Norwich 851.

Gauges—
J. A. Prestwich & Co., Northern Works, Tottenham, N.17

Gears—
Moss Gear Co., Ltd., Thomas Moss, Birmingham "Mossgear, Birmingham" Museum 70

Glue—
Cannon, B., & Co., Ltd., Offices, 110, Cannon "Beecocoln, Cannon, London" Museum 7000
Improved Liquid Glue Co., Ltd., Edge Street, Kensington, W.8. "Glue, Wesp, London" Western 1000
Meredith Co., 8, Arthur Street, E.C. Offord, Wm., & Sons, Ltd., 5, Mark

Goggles—
Triplex Safety Glass Co., Ltd., 39, St. James's, Piccadilly, W.1. "Triplex, London"

Hack Saw Blades Machines—
Victor Saw Works, Ltd., 2, Queen Victoria Street, Finsbury Circus, E.C. "Victorsaw, Phone, London" Central 1666

Heating and Ventilating—
Chas. P. Kandell & Co., Ltd., 2, Victoria Square, Victoria Street, Westminster, S.W.1.
Sturtevant Engineering Co., Ltd., 5, Victoria Street, London, S.W. "Sturtevant, London" Central 7040

Hollow Spars—
McGruer, Brentwood House, 169, Regent Street, W.1. "Mcgruer, London" Regent 1682
Rollo Wood Co., Ltd., 4, London Wall, E.C.2. "Rollo, London" Gerrard 1653 5-6
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 085

Instruments—
British Westinghouse Co., Ltd., 82, Queen Victoria Street, E.C. "Electric, London" Central 1807

Instruments (Scientific, Altimeters, etc.)—
The Cambridge Scientific Instrument Co., Ltd., Cambridge "Instruments, Cambridge" Cambridge 642.
Short & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, Walthamstow 180
London

Magneto Driving Pieces—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch"

Magnetos—
The M.L. Magneto Syndicate, Ltd., Coventry. "M.L. Magneto, Coventry" Coventry 1008-1009.
"Corvent, Coventry"
The Dixie Ignition & Ignition Co., Ltd., [illegible] Great Road, West, Acton, London
The British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Astrorotal, Coventry" Coventry 278.

Metal Manufacturers—
Clifford, Chas. & Sons, Ltd., Birmingham "Clifford." Central 4243

Metals in General—
Chester, J. B., & Son, 30, St. Mary Axe, E.C.3
Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetrs, Fen, London" Avenue 693, 696 and 7006
Samuel Mercer & Co., 108, Upper Thames Street, E.C.4. "Reconciled, London." Cannon City 6342

Metal Parts and Fittings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)
Aeroplane Metal Supplies, Ltd., Fulwood House, Fetter Lane, Holborn, London "Wappkosh, Holborn, London" Holborn 4959
Aircraft Supply Co., Ltd., Ascot House, 125, Long Acre, W.C. Upcast, Road, London Gerrard 2766 (2 lines)
Arrol-Johnston, Ltd., Hyde Road, Wilesden Junction Willesden 2207
Birfield, Jones & Bailey, Ltd., Wolverhampton. "Bayliss and Nuts" "Bayliss, Wolverhampton" Wolverhampton 1031
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhill 345 (3 lines)
Brass Metal (Kingston), Ltd., Kingston-on-Thames
Chester, J. B., & Son, 30, St. Mary Axe, E.C.3
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)
Accles & Shelvoke, Ltd., Fulwood House, Fetter Lane, Holborn, London "Wappkosh, Holborn, London" Holborn 4959
Aeroplane Metal Supplies, Ltd., Ascot House, 125, Long Acre, W.C. Upcast, Road, London Gerrard 2766 (2 lines)
Arrol-Johnston, Ltd., Hyde Road, Wilesden Junction Willesden 2207
Birfield, Jones & Bailey, Ltd., Wolverhampton. "Bayliss and Nuts" "Bayliss, Wolverhampton" Wolverhampton 1031
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhill 345 (3 lines)
Brass Metal (Kingston), Ltd., Kingston-on-Thames
Lombard Rod and Tube Co., Lombard Street, Birmingham "Lombardic, Birmingham" Midland 211 (2 lines)
Mann, Egerton & Co., Ltd., 175, Cleveland Street, London, W.1. "Brisk Burn, London" Museum 70
Mason, Ford, Fric., Ltd., Tilford, Birmingham. "Frico, Birmingham" Kings Norton 261
Mather & Platt, Ltd., Alexandra Works, Newton Heath, Manchester
Metal Sections, Ltd., Alliance House, Caxton Street, London, W.1. "Metalsec, London" Victoria 9000
Parker, Winder & Achurch, Ltd., Aston, Birmingham
Pitt, Chas., & Co., Ltd., Alliance Street, London, W.1. "Pitt, London" Regent 1276
Rubery, Owen & Co., Darlaston, South Staffs
Sankey, Joseph, & Sons, Ltd., Hadley, Wellington, Salop "Sankey, Wellington, Salop"
Shorrocks, Ltd., Bolton
Smith, Edgar, & Co., Ltd., Sheffield "Sandex, Wellington, Salop"
The Palm Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Palmpull, Phone, London" Holborn 419
The Salt, Vero & Engineering Co., Ltd., 11, Albemarle Street, Piccadilly, W. "Salvero, Phone, London" Regent 1181
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodsnaplite, Phone, London" Willesden 2480.
Thomas Rose, Ltd., Beeches, Bilston "Thomrose, Bilston" Bilston 10
Wesley Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10

Metal Shearing Tools—
Chester, J. B., & Son, Ltd., Kensham, Bridge, "Ingenuity, Bedford" Kensham 21

Metal Spinnings—
Brass & Son, Lawrence Road, Tottenham, N.15

Metric Bolts—
Chester, Bros., Hildreth Street, Bloom, Birmingham
Rubery, Owen & Co., Darlaston, South Staffs

Miscellaneous—
Bell, H. & Son, Ltd. (Roofers, Belfast "Bell, Belfast" Belfast 4033-4034 4035.
Bowden Wire, Ltd., Willesden Junction, Harlesden, London
Brass Metal (Kingston), Ltd., Kingston-on-Thames
Brown, Bros., Ltd., Great Eastern Street, London "Unbrowned, Bishop, London"
Herbert Reed Co., Ltd., Chapel-en-le-Frith, Stockport, Birmingham "Central 793.
Maclennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Cloths City 3115

Motor Cars—
Arrol-Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282
Mann, Egerton & Co., Ltd., 379-381, Euston Road, London, N.W.1. "Mangecar, Lusroad, London" Museum 70
Standard Motor Car Co., Coventry. "Flywheel, Coventry" Coventry 539 (4 lines)

Nameplates and Labels—
British Metal Kingston, Ltd., Kingston-on-Thames
The Clegg Metal Engraving Co., Worthing "Clegg, Worthing"

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterbys, Piccy, London" Regent 1340

Parachutes—
London" Regent 1340
E. R. Calthrop's Aerial Patents, Ltd., Elliott Street House, Eldon Street, London, E.C. "Savemanvo, Ave, London" London Wall 3266-3267

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4243

Piston Rings—
British Chuck & Piston Ring Co., Coventry "Kings, Coventry" Coventry 723.
The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield "Ocean, Sheffield" Sheffield 2149

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Lawrence Road, Tottenham, N.15

Power Presses and Dies—
Bliss, E. W., & Co., 20, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London" Hop 4340

Presswork—
Rubery, Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch, "Springs, Redditch" Redditch 61

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhill 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.
Ebara Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Ebara, Kingston" Kingston 67.
Integral Propeller Co., Ltd., "Avoprop, Hyde, London" Henlon 4, Kingsbury 104
Lang Propeller, Ltd., Weybridge "Verosticks, Weybridge" Weybridge 520-521
Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 382 (4 lines)
Odds, W. D., & Co., Leeds "Universus, Leeds" Central 1501, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347
Westland Aircraft Yeovil "Aircraft, Yeovil" Yeovil 170

Pyrometers—
The Foster Instrument Co., Letchworth, Herts "Foster Instruments, Letchworth" Letchworth 30

Radiators—
Gallay Radiator Co., Ltd., 108, Great Portland Street, W.1. "Gallaytaco, Wesdo, London" Mayfair 4826

Rigging for Aircraft—
Cradock, Geo., & Co., Ltd., Wakefield, England "Cradock, Wakefield" Wakefield 266

Rubber Tubing & Accessories—
Hancock, James, Lane, Ltd., 266, Goswell Road, London, E.C.1. "Mahintor, Telang, London" City 3811 and 3812

Safety Belts—
Holmes, H. & Son, 58, Albert Street, Manchester "Seefelt, Manchester" City 4432

Screw-driving Machines—
Russell Bros., Redditch, Ltd., Littleworth, Redditch "Instators, Redditch" Redditch 74.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhill 345 (3 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 247
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 382 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 48
Short Bros., Rochester. "Seaplanes, Rochester" Chatham 62.
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—
Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Ediface, Phone, London" 3540 Victoria (3 lines)
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodsnaplite, Phone, London" Willesden 2480

Shackles—
British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshil, Hounslow" Hounslow 254
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodsnaplite, Phone, London" Willesden 2480

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)
Arnold & Sons, Lawrence Road, Tottenham, N.15
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhill 345
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham "Brisk Burn" Central 550
British Metal (Kingston), Ltd., Kingston-on-Thames
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 147, Birmingham
Rubery, Owen & Co., Darlaston, South Staffs

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Arnold & Sons, Lawrence Road, Tottenham, N.15
British Metal (Kingston), Ltd., Kingston-on-Thames
Rubery, Owen & Co., Darlaston, South Staffs
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selsdon, Phone, London" Regent 1081
Arthur Holt & Co., Sidcup, Kent Road, North Kensington, W. Park 1115

Small Tools—
The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Pearsall, Westcent, London" Museum 2655

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 225
Ripault, Lea & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London"

Springs—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines)
Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 1620

Stampings—
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3
Arnold & Sons, Lawrence Road, Tottenham, N.15

Steel—
Allen, Edgar, & Co., Ltd., Sheffield "Allen, Sheffield" Sheffield 4027.
Firth, Thos. & Sons, Sheffield "Firth, Sheffield" Sheffield 2250 to 2252
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3
Nicklin, Bernard & Co., Birmingham "Bernard, Birmingham" Smithwick 228

Steel Stamps and Markings
John Mortlock & Sons, Cleveland Street, Mayfield, Ltd. "Dasher, Phone, London" East 2331 (2 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (3 lines)

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Lichfield, Birmingham "Fredmo, Birmingham" Kings Norton 260-262

Tapes and Smallwares—
Maclennan, John, & Co., 30, Newgate Street, E.C.1, and at Glasgow. City 3115

Timber—
Brown, R. F. & F. W., Wellston, near Nottingham Nottingham 1450
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hopton, Euston, London" Museum 396
Also at Market Harborough (Leicestershire. "Hoptons, Market Harborough" Market Harborough 13
J. Owen & Sons, Ltd., 201, Bermondsey, High Street, S.E.1. "Buccaneer, London" Hop 5 [illegible] lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London" Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1305.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers—
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Lawrence Road, Tottenham, N.15.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London" Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466 (3 lines).

Wirework—
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

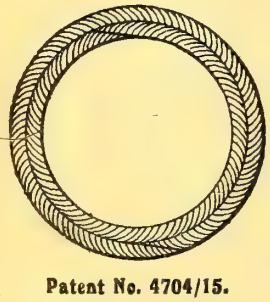
CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.C.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

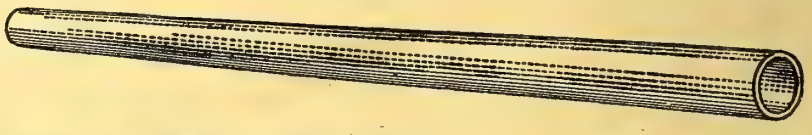
The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

Telephone: 1153 and 1154, KINGSTON. **Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.**



Patent No. 4704/15.



McGRUER SPARS are THE ACME of STRENGTH and LIGHTNESS

Particulars from:—

McGRUER BENTWOOD HOLLOW SPAR Co., Commercial Wharf, Lambeth, LONDON, S.E.1.

HEATING AND VENTILATION

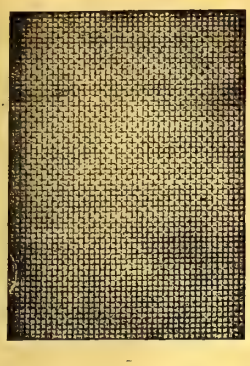
OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

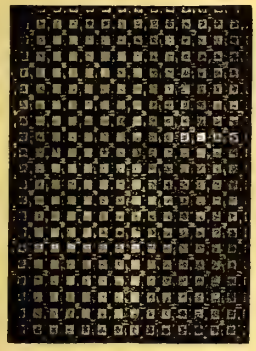
Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. **Wire: "KINNELL-BOROH-LONDON."**

CHAS. P. KINNELL & Co., LTD., SOUTHWARK ST., LONDON, S.E.1





AIR BOARD STANDARD PETROL GAUZE—CONTROLLED BY THE AIR BOARD.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY

N. GREENING & SONS, LTD. ESTABLISHED 1790.

16 FINSBURY STREET, E.C.2.

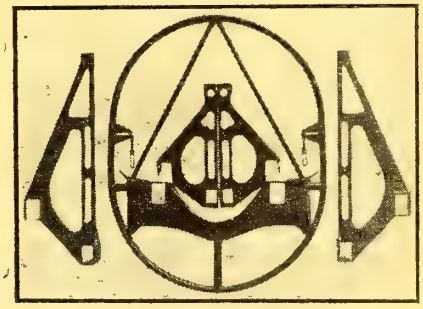
Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No. LONDON WALL 1082.

WARRINGTON.

Sopwith Engine Plates in Stock, Complete Sets.

Speciality Copper Work. WRITE FOR PRICES.





SWIFT Aviation Co.

Contractors to H.M. Government.

'PHONE—
762 KINGSTON.

KINGSTON

'GRAMS—
"SWIFT, KINGSTON."

INCREASED OUTPUT
DEMANDS
GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

The Wilfley Company, Limited
SALISBURY HOUSE, LONDON WALL, E.C. 2.

Telegrams: "Wrathless, Phone, London." Telephones: City 2681 & 2682.

SAMUEL MERCER & CO.,

Telegrams Reconciled Cannon, London

Proprietor—S. T. MERCER.

Telephone: City 6342.

Metals **for Aircraft.**

MILD STEEL SHEETS SPECN. S3 & 9A. Passed & Stamped A.I.D.

BEST CHARCOAL TINNED & LEAD COATED.

BLACK C/R and C/A SHEETS.

GALVD. SHEETS.

BRASS AND COPPER SHEETS.

SOLDER. INGOT TIN.

WELDING WIRE.

COPPER BITS, ETC.

LARGE STOCKS IN OUR OWN WAREHOUSE.



Immediate **Deliveries.**

Manufacturers of Solder *for all purposes.*

198, UPPER THAMES ST., LONDON, E.C.4.

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY: 2 pints of glue.
LOADING: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18.

¶ IF we could reconstruct as easily as we can talk of reconstruction we could afford to wait until the War **is** *over—*

But reconstruction means an infinite amount of thought and labour, therefore, we strenuously endeavour never to lose sight of the future in dealing with present evolutions in our factory.

During the War we have learned much, and the soundest way to recompense for the necessary dislocation of ordinary business is to build on our experience and bring it to bear on all our future programme.

And you can help us—we want you to—by the simple process of collaboration.

Remember our Machinery efficiency will be infinitely greater—better organised than before.

And, incidentally, better able to execute your requirements.

LET US TALK IT OVER.

SUCKLING

Wm SUCKLING & SONS

KINGSWAY HOUSE,
ALBION ST., BIRMINGHAM.

LONDON: MORLEY HOUSE,
HOLBORN VIADUCT :: E.C.1.

1368

S.E. Exhaust Pipe Extensions and Brackets
Dr. Nos. 11792 and A11793-2.
For Delivery from Stock.

Pressings in Steel up to 4-Gauge, Milling, Shaping, Turning, Grinding, Slotting.

P.D.V. AIRCRAFT Coy., Ltd., Richmond & St. Margarets.
Registered Office: PRINCESS STREET, RICHMOND.

D.H. Dies.

Send us along your enquiries and we will quote by return.

Press Tools and Gauges
made by experienced Tool Makers for the Trade.

Tanks and Sheet Metal Work.

Telephone—1681 RICHMOND. Telegrams—AEROS, RICHMOND.

THE
GRAHAME-WHITE
AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Telegrams: VOLPLANE, HYDE, LONDON.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telephone: Kingsbury 120 (5 lines).

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910. Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams JONAS, SHEFFIELD.

REGISTERED I C N TRADE MARKS.

Telephone No. 4660. Private Branch Exchange.

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

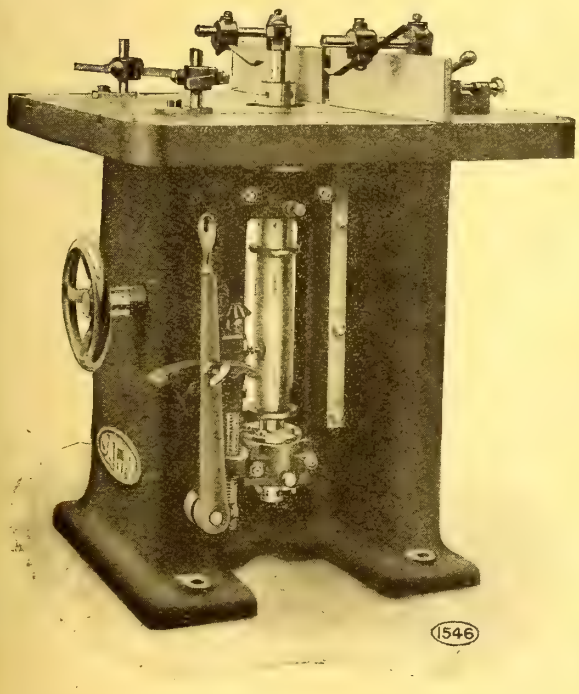
IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins etc.

SHEFFIELD.



SAGAR

***THIS ILLUSTRATION* shows**

OUR LATEST TYPE

Heavy Single Spindle Moulding and Shaping Machine

Spindle is exactly central with main Frame in all directions, and revolves in ROLLER BEARINGS.

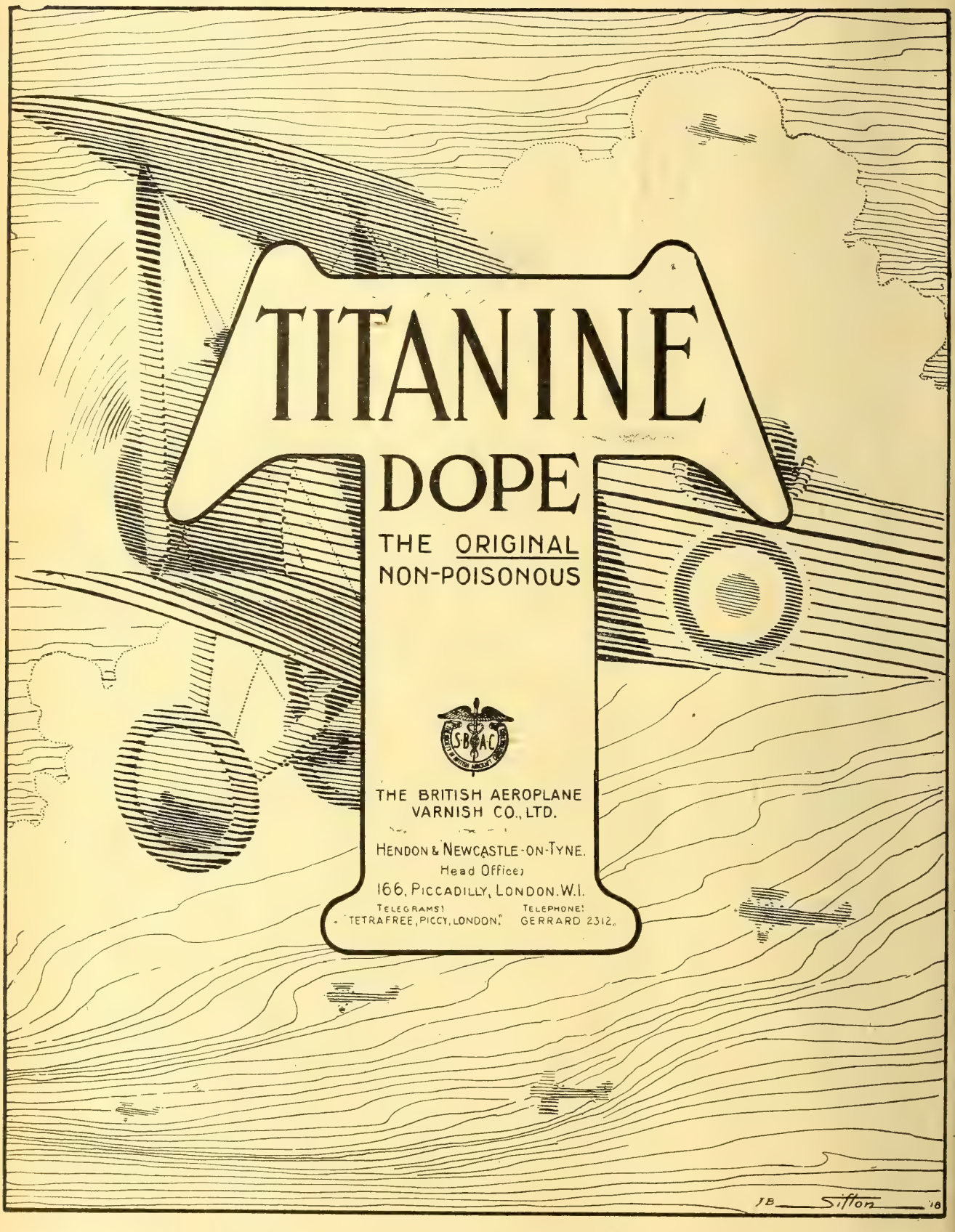
Several other new features.

Fuller Particulars on request.

We make a complete line of Woodworking Tools for Motor Body Builders, Aircraft Constructors, etc., and shall be pleased to send full particulars of our manufactures to any one interested.

J. Sagar & Co., Ltd., Saw Mill Engineers, Halifax, Eng.

LONDON OFFICE: 60, WATLING STREET, E.C.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
S.B.A.C.
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON. W.1.
TELEGRAMS: "TETRAFREE, PICCY, LONDON."
TELEPHONE: GERRARD 2312.
J B Sifton '18

machined steel forgings with the valve pockets screwed and welded into the cylinder-head. The water jackets are of sheet steel, 1.5 mm. gauge, all joints being acetylene-welded in position.

The single inlet and exhaust valves are operated by the usual Mercedes type overhead camshaft and valve gear, which is fitted with the well-known half compression gear at the rear end of the camshaft casing. This design of half compression gear is used on all types of Mercedes engines, including the 260 H.P., and the latest 180 H.P. Mercedes engines. [As already seen.—Ed.]

NOTE.—The sectional view of the connecting rod is shown at right angles to its correct position in the cylinder. (Fig. 4.)

Pistons.—Standard 160 H.P. pistons are used with concave steel crowns, screwed and welded into the cast iron skirts, which are fitted with three rings above the gudgeon pin, and one at the bottom of the skirt.

Connecting Rods.—The H. section connecting rods and floating small-end bushes are similar to those used on the 160 H.P. engines except that the big-end bearings are 3.5 mm. shorter in the 8 cylinder engines. This reduction in the length of the big-end bearings has been effected by turning off the outer faces of the connecting rod big-end brasses, evidently with the idea of reducing as much as possible the overall length of the engine.

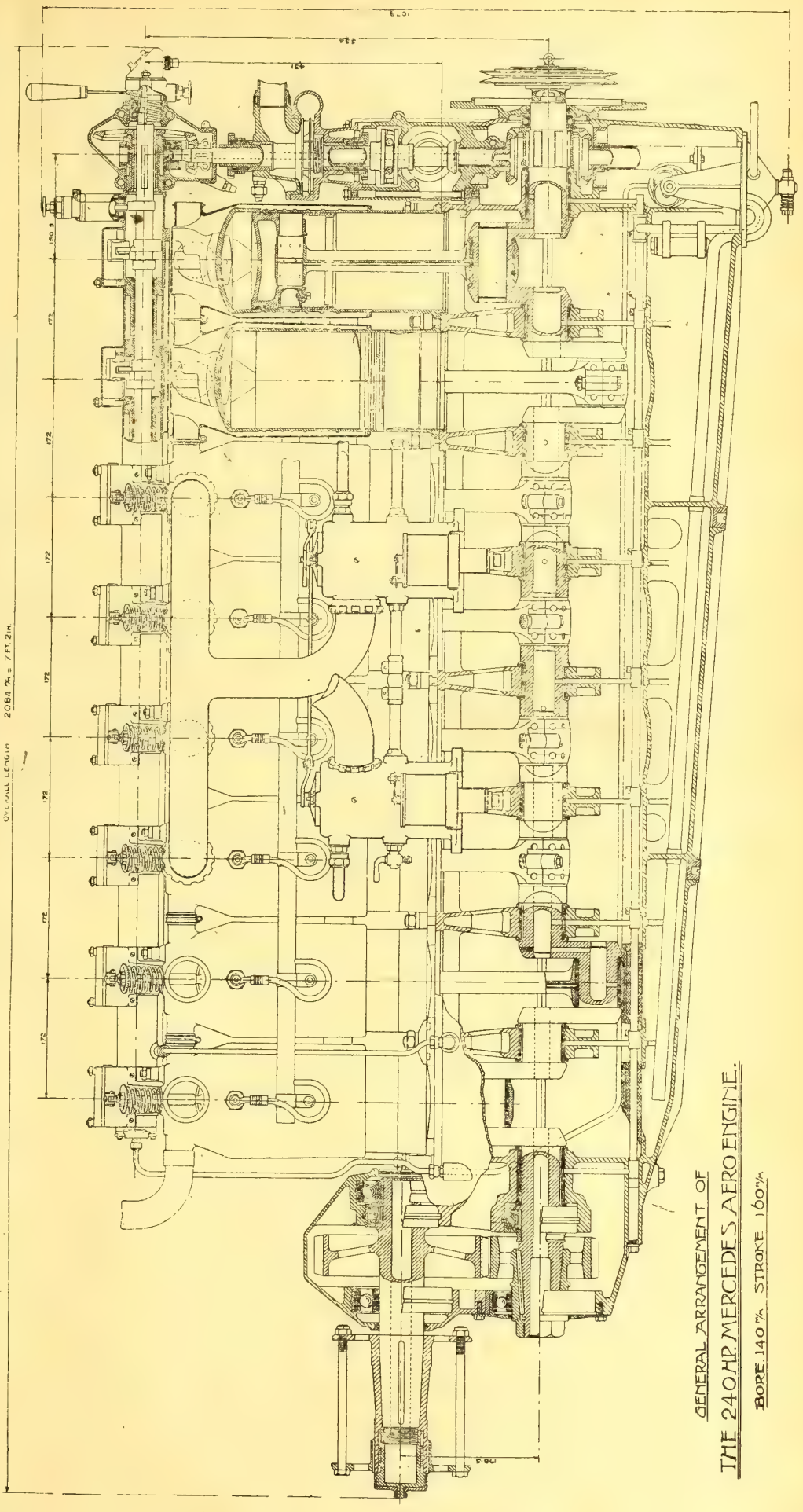
CRANKSHAFT.

The exceptional length of crankshaft and the disposition of the cranks is shown in Fig. 8. The crankshaft runs in 9 plain white metal bearings, and is fitted with a thrust ball-race at the front, at which end the driving pinion is supported by a large ball-bearing, mounted on an extension of the driving pinion.

The firing sequence occurs alternately through the first and last sets of four cylinders, i.e., 1, 3, 2, 4, 8, 6, 7, 5. It will be noticed that numbers 1 and 2 cranks are at 180° to each other, as are the cranks Nos. 7 and 8, whilst cranks 3 and 4, 5 and 6, are also set at 180° to each other respectively, but are at 90° to the front and rear pair of cranks.

The external diameter of all the journal bearings is 55.9 mm. The length of the front bearing, next to the reduction gear, is 90 mm.; all the other journal bearings are 56 mm. long, with the exception of the rear bearing, which is 80 mm. long.

The bottom halves of the main bearing housings are cast integrally with the bottom half of the base-chamber, and, as usual, are secured by long bolts passing through



GENERAL ARRANGEMENT OF THE 240 H.P. MERCEDES AERO ENGINE.
BORE 140 m/m STROKE 160 m/m

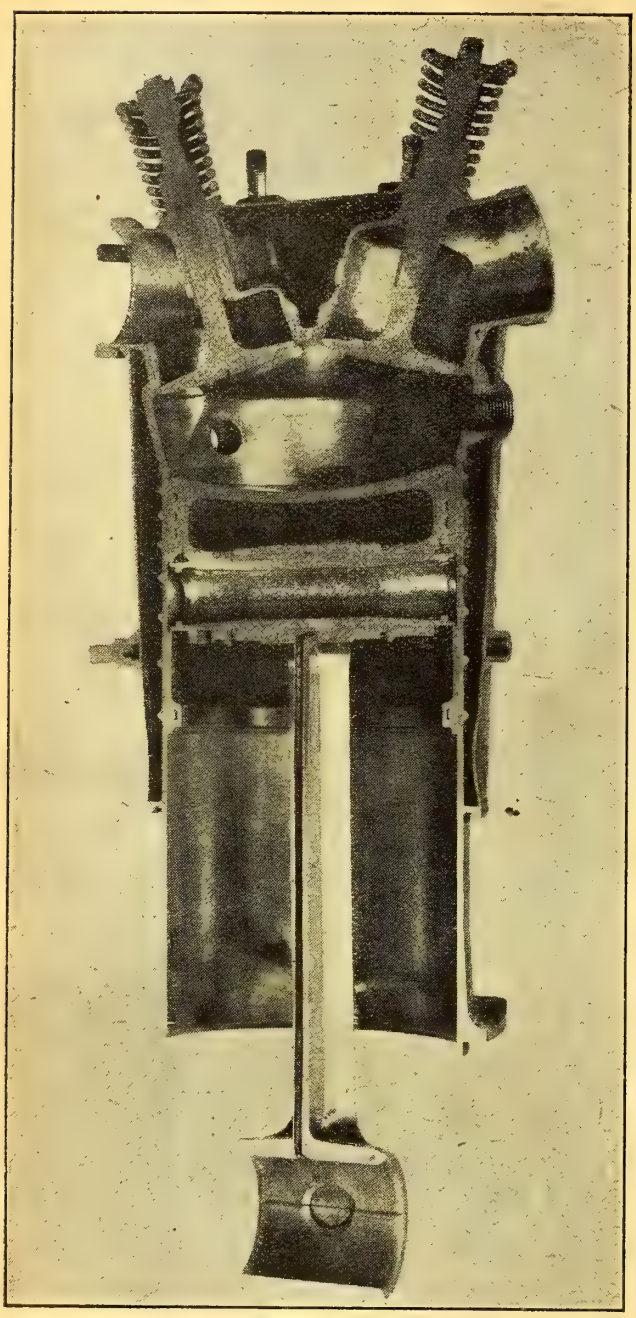


Fig. 4.—Sectional View of Cylinder, Piston, Gudgeon Pin, Connecting Rod, and Valves, showing Water Jacket Spaces and Method of Cooling Exhaust Valve Stem.

the top half of the crankchamber, and acting as the holding down bolts for the cylinders.

Following the usual Mercedes practice the crank webs are made slightly heavier in cross section towards the front end of the crankshaft. The external diameter of the crank pins is 55.9 mm., and the length of the crank pins 70 mm.

The decreasing internal diameters of the hollow crank pins and journals follows the standard Mercedes practice, the holes bored in the rear end crank pins and journals being 40 mm., whereas the internal diameters of the crank pins and journals are gradually reduced throughout the length of the crankshaft to 22 mm. at the front end.

The thrust ball race at the front end of the crankshaft is situated directly behind the reduction gear pinion, and is held in position in the two halves of the crankchamber housing, the thrust race being located by a double flanged ring, and also by a split bush and gunmetal collar on the crankshaft.

Full details of the crankshaft design are given in Fig. 8.

Reduction Gear.

In view of the fact that this engine is apparently the first attempt to introduce an indirect airscrew drive on any enemy aero engine in service, the construction of the reduction gear, as fitted to the 8-cylinder Mercedes engine, is of considerable

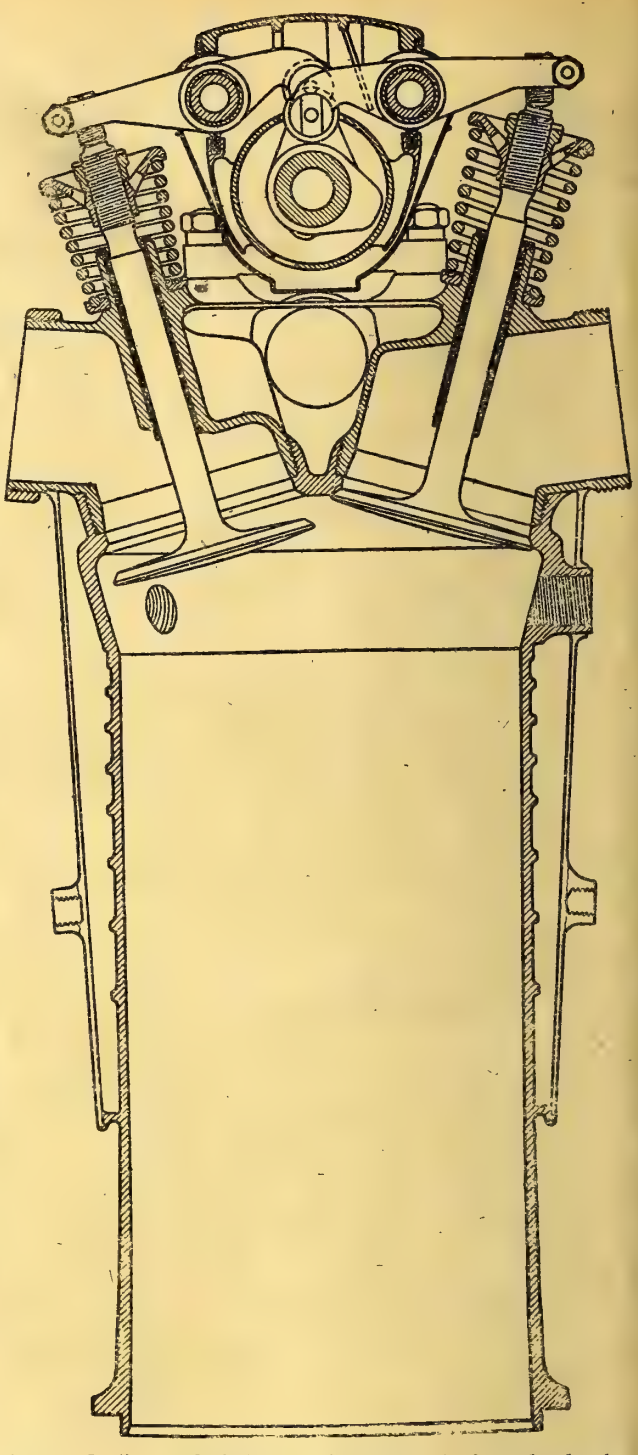


Fig. 5.—Section of Cylinder and Arrangement of overhead valve gear and cam-shaft casing.

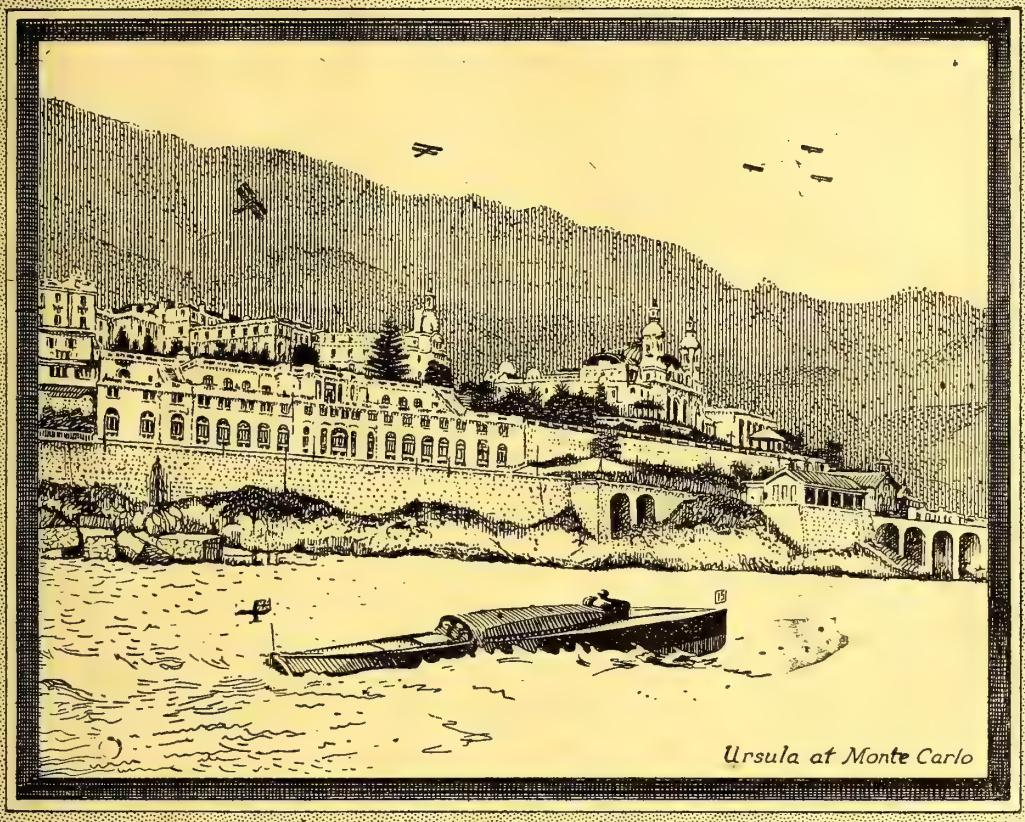
interest. The general lay-out is shown in Fig 3, and most of the details of construction in Fig. 9.

The smaller, or driving, pinion of the reduction gear is keyed to the tapered extension of the crankshaft, the key being fitted parallel to the taper on the crankshaft. The driving gear is held in position on the shaft by a large locking nut, fixed by a grub screw.

As already stated, the front end of the driving pinion is supported on a large ball race, 148 mm. dia., carried on an extension of the boss in front of the pinion.

The larger, or driven, pinion is integral with the airscrew shaft, and is machined from a solid forging, the gear wheel having holes drilled through the dished webs of the wheel to save weight. The number of teeth on the driving pinion is 26, and on the driven pinion 40, giving a speed ratio of 1.54 :1. The diameter of the crankshaft pinion is 168 mm., and that of the airscrew shaft pinion is 250 mm.

The airscrew shaft is mounted on two large ball bearings, and is provided with a thrust ball-race, which is located by a double flanged ring, registering with a groove cut in the bearing



Ursula at Monte Carlo

SAUNDERS of COWES

S. E. Saunders, Ltd.

Designers & Constructors of Air & Marine Craft

EAST COWES. I.W.

Telegrams. "Consuta" E Cowes.
Phone. Cowes 193. (4 Lines.)

SB AC — The Society of British Aircraft Construction

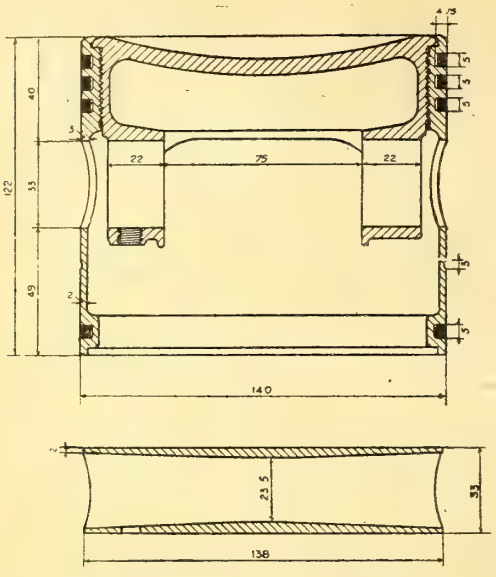


Fig. 6.—Details of Piston and Gudgeon Pin.

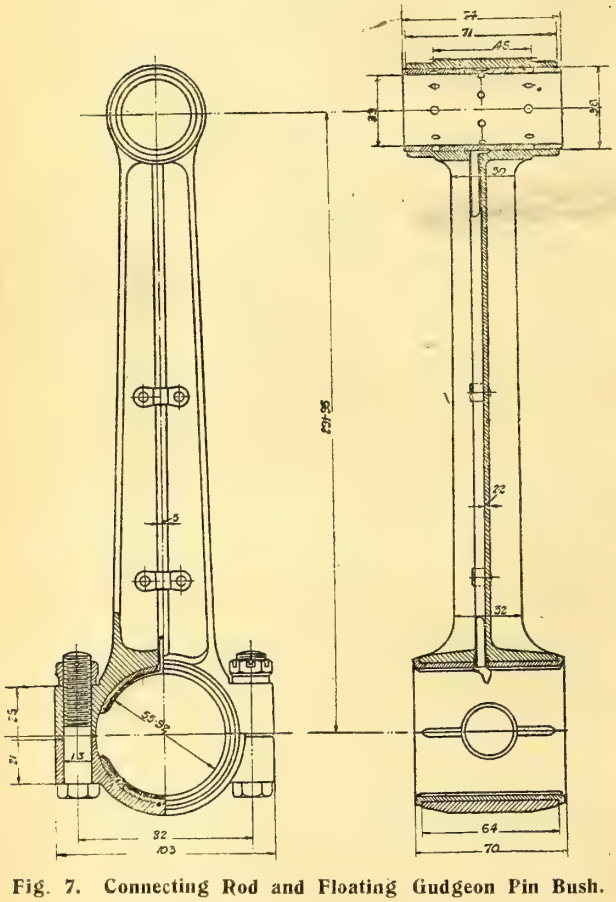


Fig. 7. Connecting Rod and Floating Gudgeon Pin Bush.

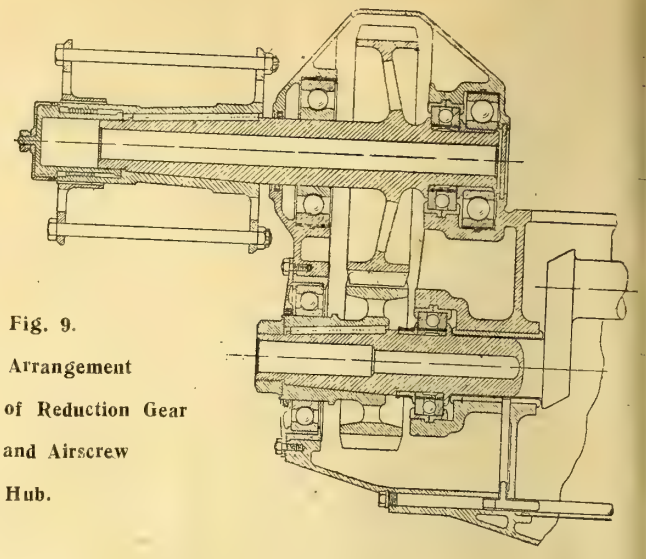


Fig. 9. Arrangement of Reduction Gear and Airscrew Hub.

housing. The diameter of the front ball-bearing of the propeller shaft is 136 mm., and of the rear ball-race 128 mm.

The method of mounting the rear ball-bearing, and also the two thrust-races, of the reduction gear shafts is unusual. The thrust ball-race behind the crankshaft pinion is mounted on the shaft on the two halves of a steel split bush, over which a gunmetal collar fits tightly. The two rings of the thrust race fit on the outside of the gunmetal collar. The thrust race is then located by a second split bush of steel, the halves of which are also held together by a collar, the split bush being in turn located by a shoulder machined on the crankshaft. The rear ball-bearing on the airscrew shaft, with its thrust race, is mounted in a similar manner, as shown in Fig. 9.

The reduction gear bearings are enclosed in gunmetal locating bushes fitting into recesses machined in the aluminium casing, which forms an extension of the crankchamber, and the two halves of the casing are held in position by six long bolts, passing through the two halves of the airscrew shaft bearing housings.

The airscrew hub is mounted on the tapered extension of the airscrew shaft extension, and is secured as shown by a key, and also by the usual Mercédès airscrew hub locking nut, which carries a flanged locking plate on a stud in front of the nut. This flanged plate, or cup, is provided with notches, cut on the inside of the flange, registering with the flats of the hub locking nut, and also with the serrations cut on the outer surface of the airscrew hub, onto which the front flange of the hub fits.

A conical metal cap was fitted in front of the airscrew hub.

Carburetters and Induction System.

Two standard 2 jet 160 H.P. Mercedes carburetters are fitted as shown in the photograph of the engine (Fig. 1). The two throttles are, of course, interconnected.

The left hand carburetter feeds cylinders 1, 2, 7, and 8, whilst the right hand carburetter feeds the four central cylinders. The induction pipes are of copper, lagged with asbestos cord and bound with adhesive tape. The internal diameter of the induction pipe is 54 mm., and the smallest diameter of the choke is 24 mm.

The air intake to the carburetters is through the large passages cast in the top half of the crankchamber, which lead to the central portion below the false bottom of the base chamber between the front and rear oil sumps, as in the 160 H.P. engines. Details of the water piping to the water jackets of the carburetters are shown in the photograph (Fig. 10).

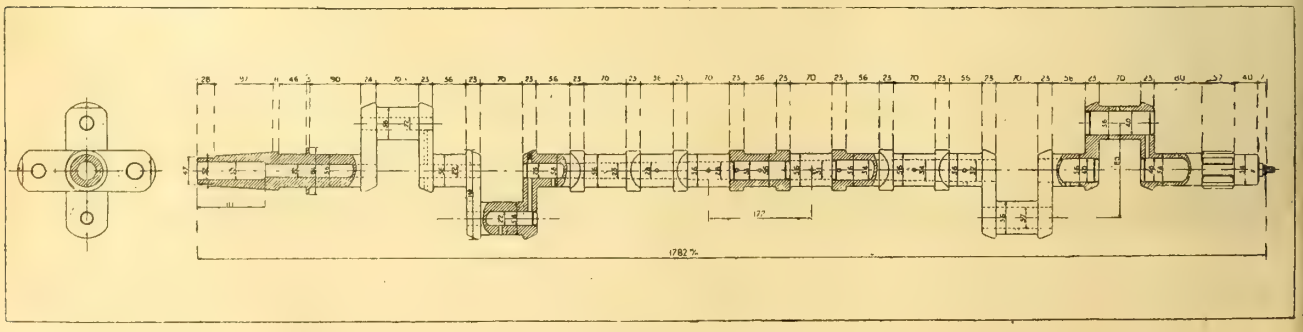


Fig. 8.—Details of Crankshaft.

ASCOL

SHACKLES.

A.G.S.



No. 158

"A" "B" "C" "D" "E"

THE "ASCOL" SHACKLE CHART

contains a table of test results on one week's consignment of SHACKLES, together with STOCKS of all mark numbers with prices for SHACKLES, PINS, and SPLIT PINS for same; a copy of this Chart is enclosed in every envelope leaving "Ascol" House

THIS WEEK.

THE "ASCOL BOOK" contains a reprint of all the articles which have appeared in "Aircraft Supplies," details of A.G.S. Parts, sections dealing with "Ascol" Charts, a Beginner's Guide, and a reprint of the Glossary of Aeronautical Terms from "The Aeroplane Speaks," by kind permission of the Publishers, Messrs. McBride, Nast & Co. Price, 3/6. Special bound copies at 10/6 (Postage 6d. extra). ORDER YOUR COPIES NOW, TO BE INVOICED ON PUBLICATION.

THE

AIRCRAFT SUPPLIES

COMPANY LTD

ASCOL HOUSE, 125, LONG ACRE,

LONDON, W.C.2.

Telephone: Gerrard 276. *Telegrams: "Upcast, Rand, London.*

G. H. MANSFIELD, MANAGING DIRECTOR.

SBAC THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

According to a report on the aeroplane from which this engine was taken, the main petrol tank (forming the pilot's seat), had a capacity of 50 gallons, and the machine carried an auxiliary tank of 6½ gallons capacity, situated between the pilot's and observer's seats.

[The carburetter is of the same type as in the 180-h.p., but the pilot jet is .5 mm. diameter and the main jet 2 mm. diam.—Ed.]

Crank-Chamber.

Apart from the additional length and the extension of the crankcase casting for the reduction gear, the crankcase, in its general construction, follows the design of the 160 H.P. Mercedes, the bottom half being constructed with a false bottom, below which are the two oil sumps, one at the front and one at the rear end of the base chamber, as shown in the sectional arrangement of the engine (Fig. 3).

Three breathers are provided in the top half of the crank-chamber on the exhaust side. The central breather is connected by a large diameter pipe to the air chamber, between the two oil sumps in the bottom half. This air chamber (as shown on Fig. 2) is open on the exhaust side, and communicates with the air intake passages to the two carburetters

Vertical Driving Gear.

The method of driving the camshaft vertical driving spindle

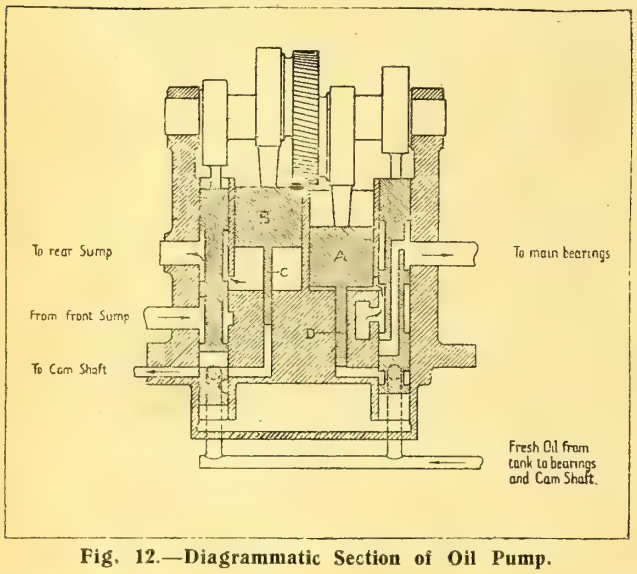


Fig. 12.—Diagrammatic Section of Oil Pump.

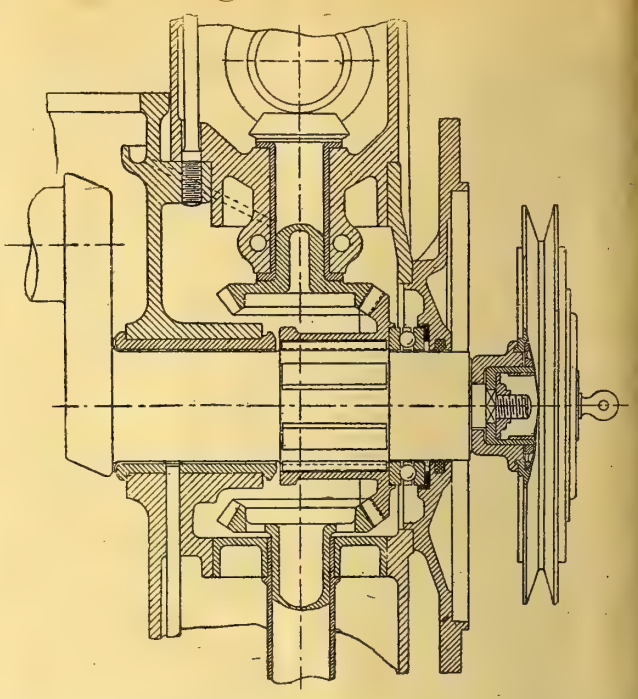


Fig. 11.—Arrangement of Floating Bevel Gear and Wireless Clutch Pulley on Rear End of Crank-Shaft.

(which also drives the magnetos and water-pump, by means of the floating bevel pinion fitted on the rear end of the crank-shaft) follows standard Mercedes practice. The details of the construction of the floating pinion with its thrust race, permitting slight longitudinal movement of the crankshaft without disturbing the mesh of the driving bevels, is well known. The general arrangement of the complete driving gear, including the vertical spindle driving the oil pump worm gear, is clearly shown in the sectional arrangement of the engine (Fig. 3), and also in the detail sketch of the floating pinion (Fig. 11).

Lubrication.

A diagrammatic sectional view of the standard 160 H.P. Mercedes oil pump, used on the 8-cylinder type, showing the various leads, and demonstrating the functions of this somewhat complicated pump is given in Fig. 12.

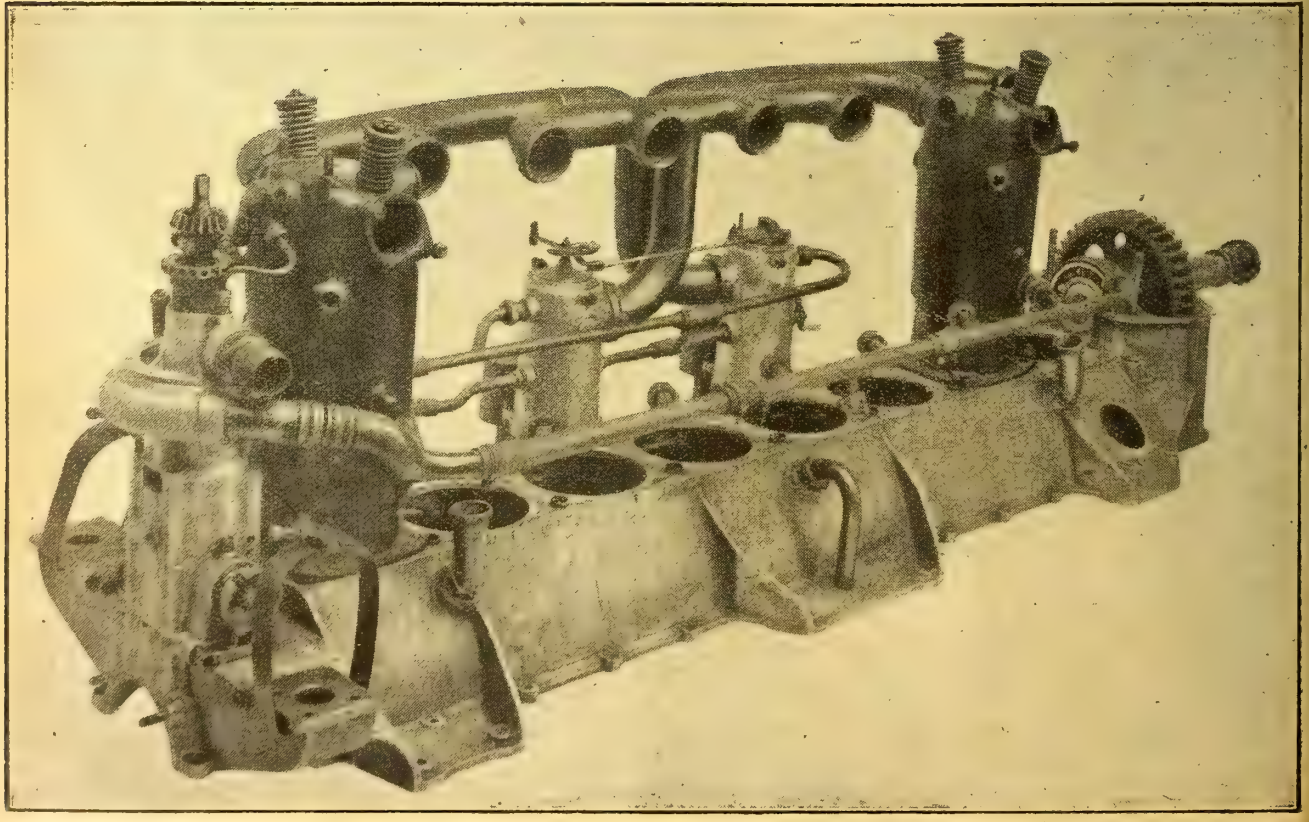


Fig. 10.—Cylinder Section of Crank-Chamber, showing Carburetters and Inlet Pipes and Arrangement of Water-Piping, etc.

Firth's Best Cast Steel Files.

Apply for Copy of the New Official Price List.

Thos. Firth & Sons, L^d, Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court, Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

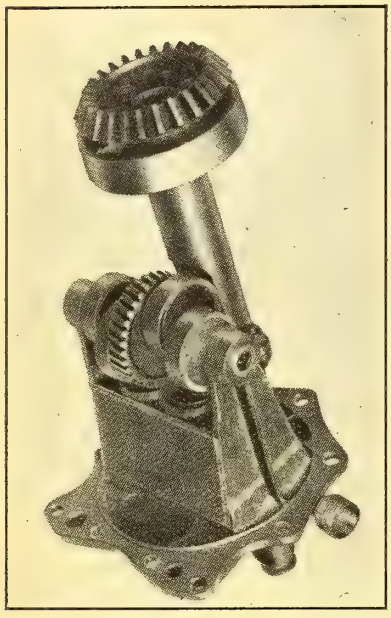


Fig. 13.—View of Complete Oil Pump.

The oil-pump is attached by studs through a flange to a face machined at the end of the bottom half of the base-chamber, and is easily detachable. It is actuated through worm-gearing by a vertical shaft, driven off the rear end of the crankshaft. In its functions this oil-pump is somewhat similar to the pump used on the 260-h.p. Mercédès, already described in detail in a previous report. Briefly described, the 160-h.p. type of oil-pump embodies three main functions, i.e.,

(*a*) Delivery of oil under pressure from the rear sump, formed in the bottom of the base-chamber to the crankshaft, and connecting-rod bearings by main plunger A.

(*b*) Delivery of a charge of fresh oil at every stroke of the two auxiliary plungers (C and D) from the oil service tank to the main-bearings, camshaft bearings, and valve gear through the hollow camshaft.

(*c*) Suction from front sump in base chamber to rear sump by the plunger B.

Surplus oil returns to the front and rear sumps in the crank-chamber through perforated steel plates from the overhead camshaft casing through a long trough of sheet brass attached to the underside of the camshaft casing, and through copper pipes leading from the front and rear ends of the trough to the crank-chamber. The reduction gears are lubricated by oil retained in a trough, formed in the lower portion of the reduction gear casing.

Water Circulation.

The water pump driven from the camshaft vertical

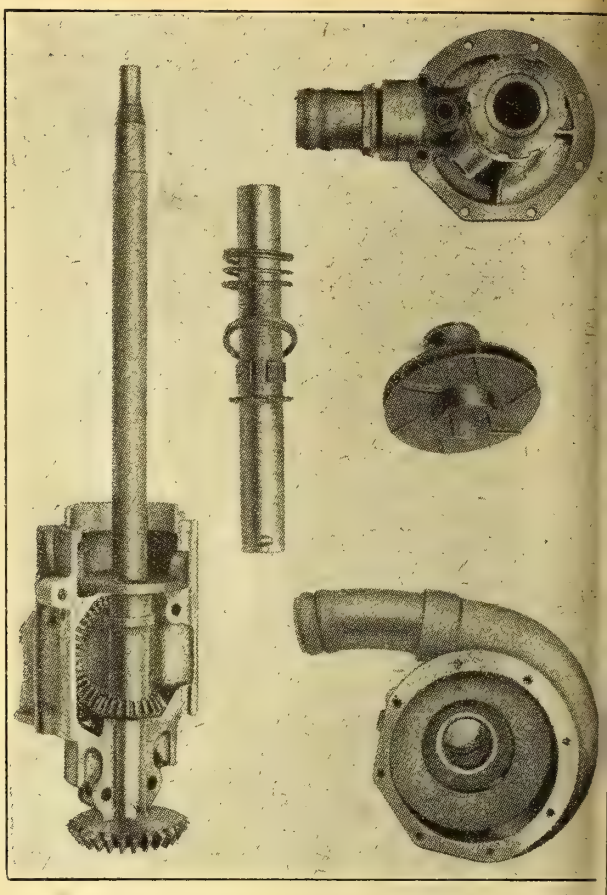


Fig. 15.—Water-Pump and Vertical Shaft dismantled.

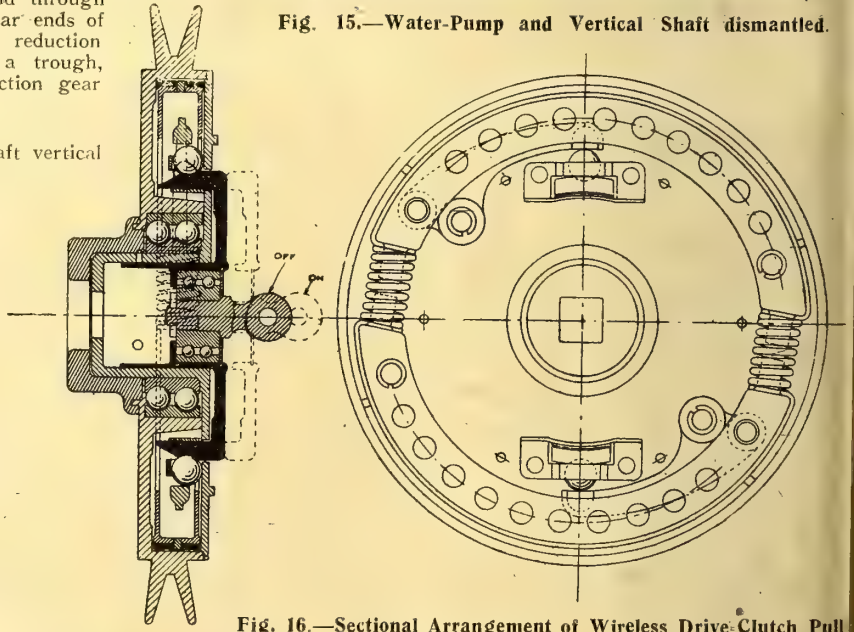


Fig. 16.—Sectional Arrangement of Wireless Drive-Clutch Pull

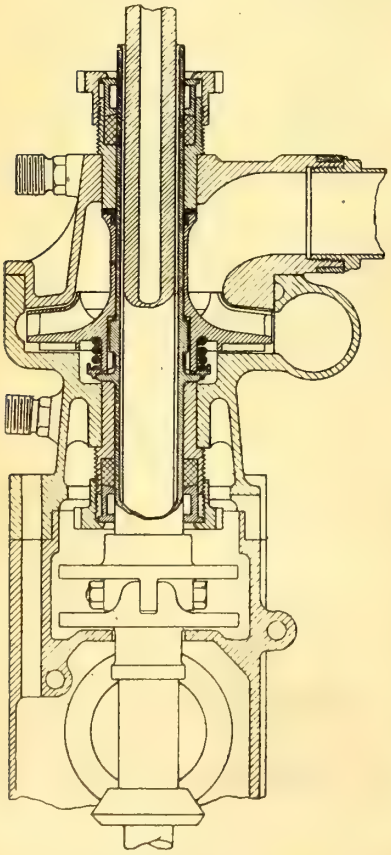


Fig. 14.—Section of Water-Pump.

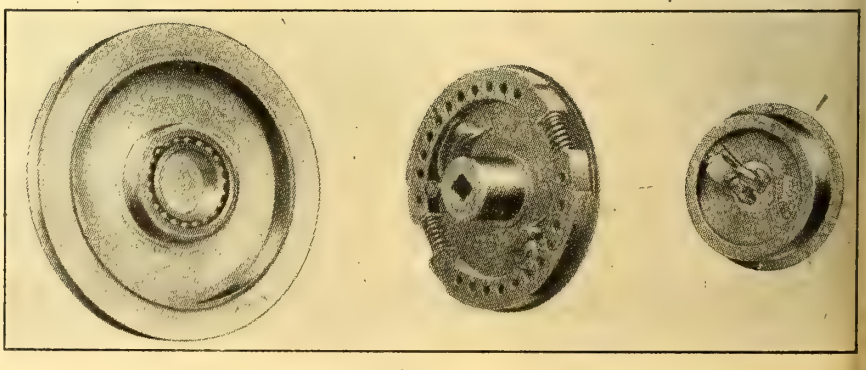


Fig. 17.—View of Wireless Dynamo-Clutch Pulley dismantled.



ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

Allen's Steels

For Motor Cars
For Aeroplanes

Air-hardening gear steel.

Where efficiency has to be considered above everything else, attention is called to

Allen's

Nickel Chrome Steel
(Air hardening type).

Supplied in annealed state, ready for machining. In spite of its great strength it retains remarkable toughness.

Aeroplane Steels of all kinds.

Write for Catalogue D.
(Aeroplane and Motor Steels), Post Free.

Edgar Allen & Co. Ltd
Sheffield.

driving-shaft differs slightly from 160-h.p. Mercédès pump, chiefly in the drive. In the 160 H.P. pump the rotor is fixed directly to the vertical camshaft driving spindle by six serrations. In the 8-cylinder Mercedes pump the spindle of the pump rotor is hollow and is driven from the lower part of the vertical driving-shaft by means of a dog clutch. There is a clearance of 2 mm. between the internal diameter of this hollow spindle and the vertical shaft. The rotor floats upon this hollow spindle, and is attached by means of six serrations, which allows a slight vertical movement between the spindle and the rotor. The latter is kept in close contact with the lower face of the upper bearing of the pump spindle by a coil spring.

The diameter of both the inlet and outlet passages of the water pump is 35 mm.

The water jacket capacity of one cylinder is 1,280 c.cs.

In the aeroplane from which this engine was taken a small radiator was fitted in the centre of the top plane, having its intake pipe leading from the front cylinder of the engine and its outlet leading through the right hand strut of the cabane. Further details of the construction of the water pump are illustrated in the sectional arrangement of the pump (Fig. 14).

Water Pump Test Report.

The water pump was detached from the engine and tested separately, coupled to an electric motor. Separate delivery curves were taken against varying pressure. The results of these tests are given in the diagram, Fig. 26.

At a pressure of 2 lbs. per sq. in. it was found that 1,000 r.p.m. was the lowest speed at which delivery occurred, and similarly at 4 lbs. per sq. in. and 6 lbs. per sq. in. the lowest delivery speeds were 1,400 r.p.m. and 1,700 r.p.m. respectively. As the ratio of the pump speed to crankshaft speed is 1.5—1, these figures correspond to engine speeds of 667, 934, and 1,133 r.p.m. respectively.

At the normal engine speed of 1,350 r.p.m. the pump is delivering approximately 91 gallons per minute, this figure being estimated from the curves.

On dismantling the water pump it was found that the hollow driving spindle of the rotor was binding on the vertical driving shaft, in spite of the clearance allowed, and also the pump rotor was binding tightly with rust and mud upon its serrations on the hollow spindle, so that no floating action of the rotor or movement of the spring were possible.

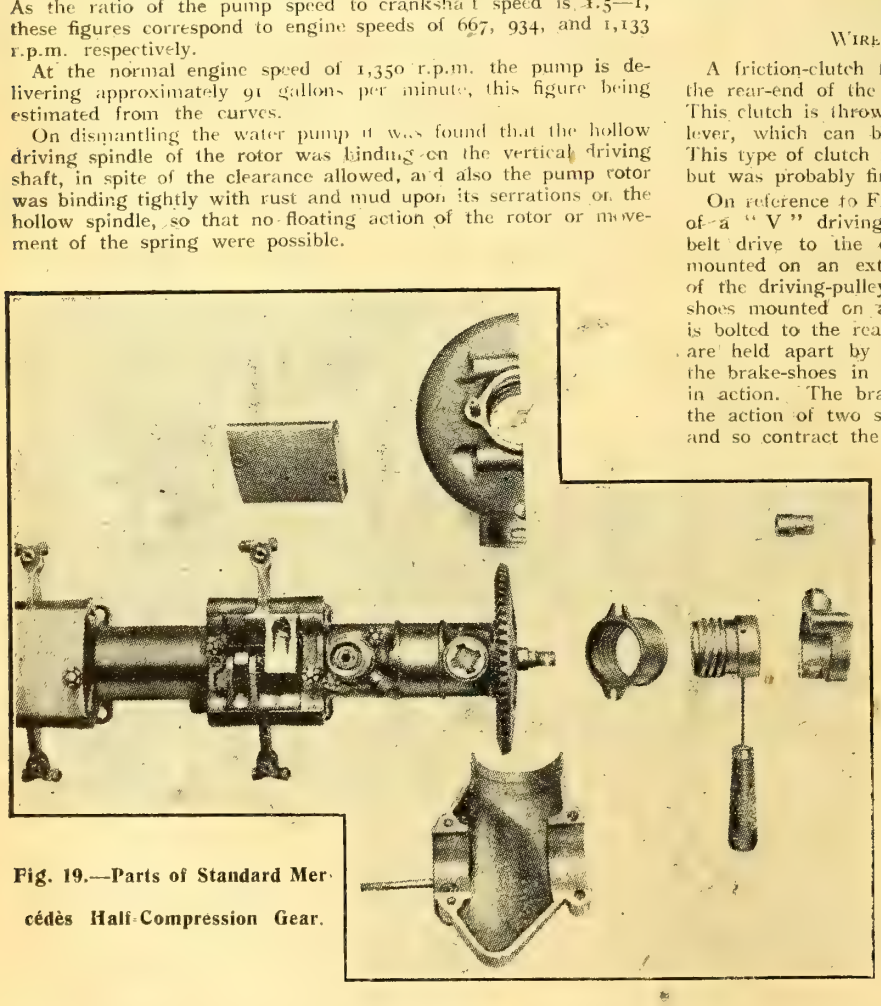


Fig. 19.—Parts of Standard Mercédès Half-Compression Gear.

Ignition.

Two H.L.8 type Bosch magnetos are fitted transversely on brackets at the rear end of the engine, and are driven as in the 160 H.P. engines, through dog clutches, directly off the camshaft vertical driving-shaft through bevel gears below the water pump, as shown in Fig. 2. The magnetos run at engine speed, and the unusual firing sequence, as already mentioned, is as follows:—1, 3, 2, 4, 8, 6, 7, 5.

The ignition timing is 30° early fully advanced

Two Bosch 3 point plugs are fitted, one on either side of each cylinder, opposite and below each valve.

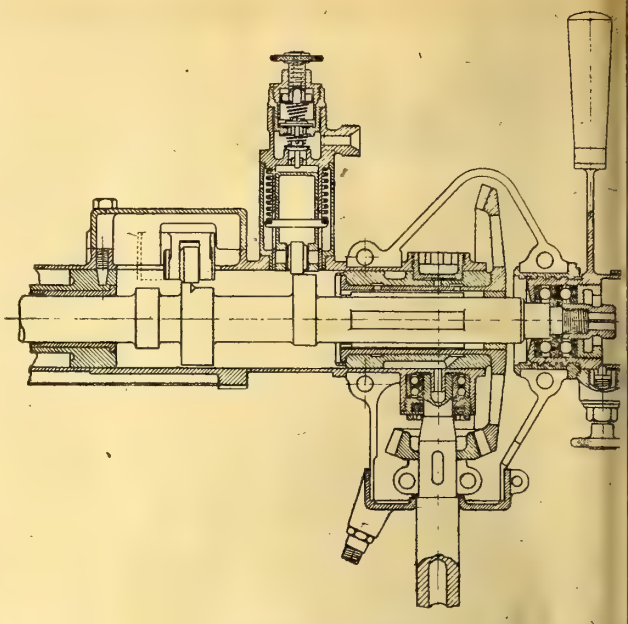


Fig. 18.—Arrangements of half-compression gear camshaft dri and details of air-pump.

Wireless Dynamo Clutch-Pulley.

A friction-clutch for driving the wireless dynamo is fitted the rear-end of the crankshaft, details being shown in Fig. 2 This clutch is thrown in and out of engagement by a cable a lever, which can be operated either by the pilot or observe This type of clutch is now fitted on most of the enemy machine but was probably first used on the 8-cylinder Mercedes engines

On reference to Fig. 16, it will be seen that the clutch consis of a "V" driving pulley made of aluminium for taking t belt drive to the dynamo, running upon a double ball rac mounted on an extension of the crankshaft. Inside the ri of the driving-pulley is arranged a pair of semi-circular bral shoes mounted on a plate forming part of the extension whi is bolted to the rear end of the crankshaft. These brake-sho are held apart by two strong coil springs that serve to ho the brake-shoes in close contact with the driving-pulley whil in action. The brake-shoes are thrown out of engagement the action of two small levers which compress the coil spring and so contract the brake-shoes. The brake levers are operat by two striking wedges that are pushed or out of engagement by the action of t operating rod controlled by a cable a spring from the pilot's seat. To lock t brake-shoes in the "in" or "out" po tions, steel balls are used between t ends of the striking levers and wedg fitted with locking grooves as shown the sectional drawing.

The brake-shoes are constructed of st forgings lined with bronze on their out faces, which bear directly on the insi of the cast aluminium driving-pulley ri

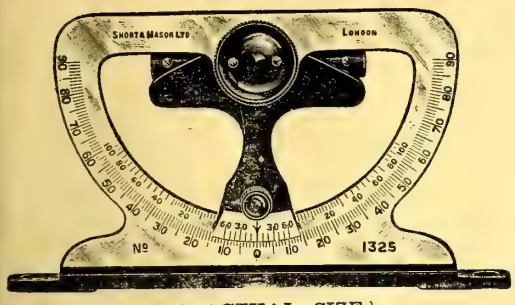
Air Pump.

The air pump of the spring load plunger type is fitted towards the re end of the camshaft casing between t half compression gear and Number cylinder valve-rockers. The pump operated by a cam formed on the end the camshaft. Further details of the pump are shown in the arrangement of half compression gear (Fig. 18).

F. G. C.
March, 1918.

Engine Data.

Number and arrangement of cylinders	Eight, vertical, separa
Bore	5.51ins. = 140 mms.
Stroke	6.30ins. = 160 mms.
Stroke/Bore ratio	1.142 : 1.
Area of one piston	23.84 sq. ins. = 153.9 s cms.
Total piston area of engine	190.83 sq. ins. = 1231 s cms.
Stroke volume of one cylinder	150.28 cu. ins. = 2463 c cms.



(HALF ACTUAL SIZE.)



(HALF ACTUAL SIZE.)

"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES
TO CLOSE LIMITS DURING

ASSEMBLING AND CONSTRUCTION.

HEIGHT MEASURING

ANEROID ALTIMETERS

FOR EVERY TYPE OF

AIRCRAFT

MANUFACTURED BY

SHORT & MASON, Ltd.,

WALTHAMSTOW, LONDON, E.17.

Telegrams: "Aneroid, Phone, London."
Telephone: Walthamstow 180.

BEARDMORE AERO ENGINE

The name which guarantees EFFICIENCY and advanced design.

THE BEARDMORE AERO ENGINE Ltd.,
London Showrooms and Depot:
112, Gt. Portland St.,
LONDON, W.1.
Telephone - Gerrard 238

C.D.C.

Total stroke volume of engine	1202.24 cu. ins. = 19704 cu. cms.
Volume of clearance space	40.30 cu. ins. = 660 cu. cms.
Compression ratio. Total volume/Clearance volume	4.73 : 1.
Max. B.H.P. and speed	287 B.H.P. at 1750 R.P.M.
Normal B.H.P. and speed	242 B.H.P. at 1350 R.P.M.
Piston speed at normal speed	1418 ft. per min.
Brake mean pressure at normal speed	118 lbs. sq. in.
Cu. ins. of stroke volume per B.H.P.	4.97 cu. ins.
Sq. in. of piston area per B.H.P.	0.788 sq. in.
B.H.P. per cu. ft. of stroke volume	348.0.
B.H.P. per sq. ft. of piston area	182.7.
Direction of rotation of crank	Anti-clockwise, facing airscrew.
Direction of rotation of airscrew	Left hand tractor.
Normal speed of airscrew	977 R.P.M.
Ratio of crankshaft speed to airscrew speed	1.382 : 1.
Type of gear reduction to airscrew	Spur gear.
Lubrication system	Forced, multiple plunger pumps.
Oil temperature	37.5° Cent. (Test figures.)
Oil consumption per hour	10.16 pints = 11.43 lbs.
Oil consumption per B.H.P. hour	0.042 pint = 0.047 lb.
Specific gravity of oil	0.900.
Type of carburetters	Two, Mercedes, twin-jet.
Diameter of chokes	0.945in. = 24 mms.
Bore of main jets	0.078in. = 2 mms.
Bore of pilot jets	0.0197in. = 0.5 mms.
Fuel consumption per hour	141.3 pints = 127.1 lbs.
Fuel consumption per B.H.P. hour	0.582 pint = 0.524 lb.
Specific gravity of fuel	0.720.
Inside diameter of induction pipes	2.125ins. = 54 mms.
Type of magnetos	Two, Bosch, H.L.8.
Firing sequence of engine	Airscrew, 1-3-2-4-8-6-7-5.
Speed of magnetos	Engine speed.
Magneto timing. (Degrees early, full advance)	30° early.
Inlet valve opens. Degrees on crank	2° late.
Inlet valve closes. Degrees on crank	51° late.
Diameter of inlet valve (smallest diam.) = d	2.677ins. = 68 mms.
Lift of inlet valve = h	0.450in. = 11.4 mms.
Area of inlet valve opening (π d h)	3.780 sq. ins. = 24.40 sq. cms.
Mean gas velocity through inlet valve at normal speed	149.5 ft. per sec.
Clearance of inlet tappet	0.012in. = 0.305 mms.
Exhaust valve opens. Degrees on crank	52° early.
Exhaust valve closes. Degrees on crank	16.5° late.
Diameter of exhaust valve (smallest diam.) = d	2.677in. = 68 mms
Lift of exhaust valve = h	0.412in. = 10.48 mms.
Area of exhaust valve opening (π d h)	3.460 sq. ins. = 22.4 sq cms.
Clearance of exhaust tappet	0.018in. = 0.457 mms.
Weight of engine complete, without water, fuel or oil	900 lbs. (including exh. manifold and airscrew hub.)
Weight per B.H.P.	900/242. 3.72 lbs. per B.H.P.
Weight of exhaust manifold	19.5 lbs.
Weight of oil carried in engine	17 pints = 19.13 lbs
Weight of fuel per hour	127.1 lbs.
Weight of oil per hour	11.44 lbs.
Total weight of fuel and oil per hour	138.5 lbs.
Gross weight of engine in running order, less fuel and oil	1057 lbs. (Including cooling system, 242 × 0.65 lbs.)

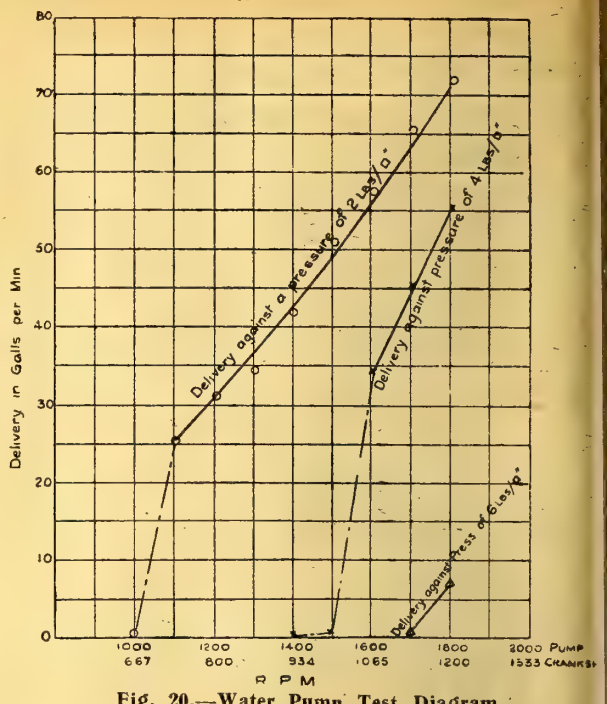


Fig. 20.—Water Pump Test Diagram.

Weight per B.H.P.	1057/242. 4.37 lbs.-B.H.P.
Gross weight of engine in running order with fuel and oil for six hours	1971 lbs. (Tanks at 1 of wgt. of fuel and
Weight per B.H.P.	1971/242. 8.15 lbs. B.H.P.
Delivery of water pump at 1350 R.P.M. of engine	91 gallons per min.
Water jacket capacity of one cylinder	1280 cu. cms.
Ratio of water pump speed to crankshaft speed	1.5 : 1.
Water temperature. Inlet	65° Cent.
Water temperature. Outlet	78° Cent.
Diameter of water pump inlet and outlet	1.37in. = 35 mms.

GENERAL ANALYSIS OF WEIGHTS.

Description of Part.	No. per set.	Average unit weight in lbs.	Weight of complete set in lbs.	Percen of tot weigh
Cylinders (Bare)	8	19.25	154.00	17.11
Pistons complete with rings and gudgeon pins	8	6.85	54.80	6.08
Connecting Rods complete with floating bushes	8	5.00	40.00	4.44
Valves, Inlet and exhaust complete	16	1.312	20.992	2.33
Crankshaft, with floating bevel gear	1	94.50	94.50	10.50

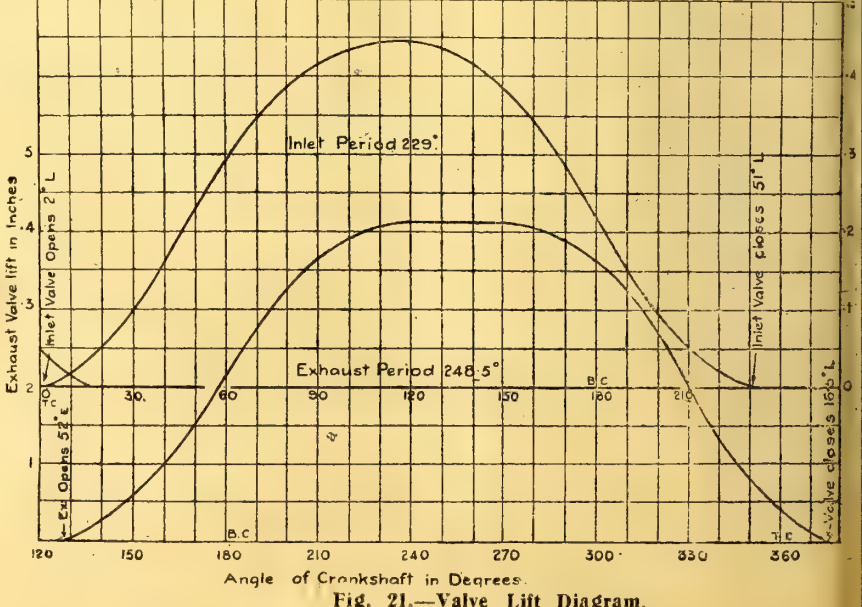
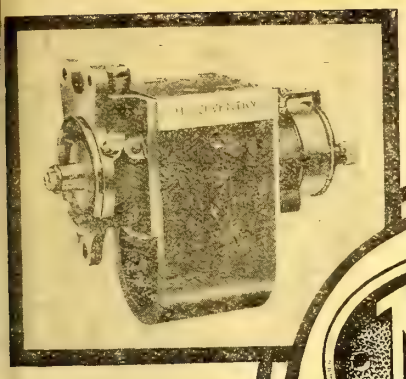
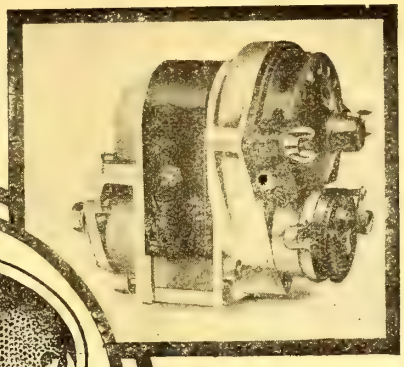


Fig. 21.—Valve Lift Diagram.



Type A.D.S.



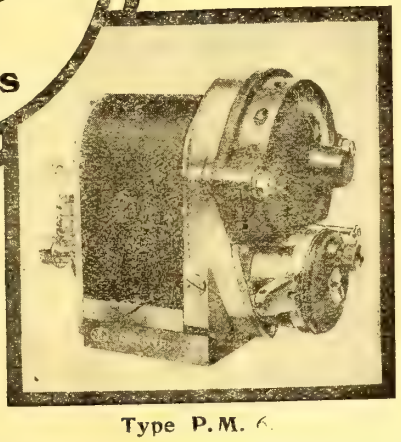
Type P.L. 7.

M-L

All-British
Magnetos



Type P.L.R.



Type P.M. 6.

All-British
Magnetos
for
Aircraft.

THE strong features of M-L All-British Magnetos which have made the aero types so successful are lightness, efficiency and effective sparking at very low speeds.

M-L Magnetos are smaller, lighter and stronger, and are more efficient than any pre-war magnetos of equal electrical output. All parts are interchangeable, "spares" can be quickly supplied.

The M-L Magneto Synd., Ltd., have been making magnetos for Aero Engines since 1914.

The illustrations show some of the M-L All-British Magnetos for Aircraft. Types A. D. S. and P. L. R. are designed for Rotary Engines. Types P. L. 6 and P. L. 7 are for 6 and 7 cylinder Radial Engines. Types P. L. 6 and P. M. 6 are for Vertical and V Type Engines.

Descriptive Lists sent on request.

The M-L Magneto Synd., Ltd.
COVENTRY.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

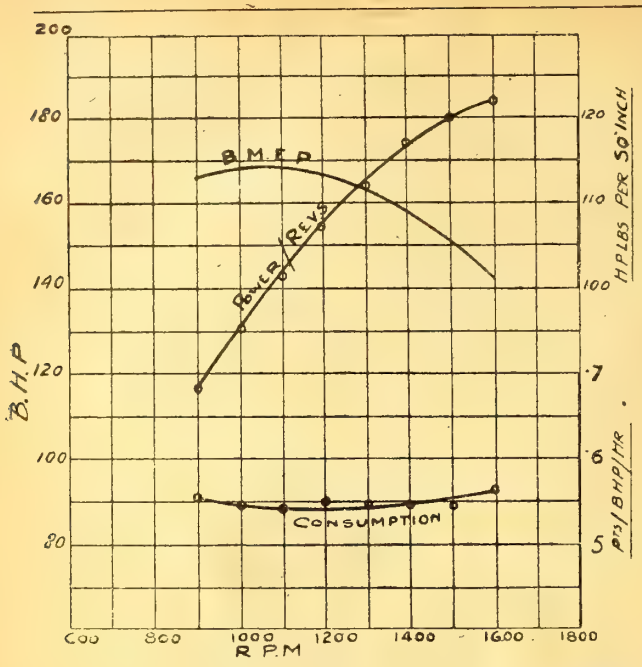
MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE

"CLERGET" PATENT AERO ENGINES.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

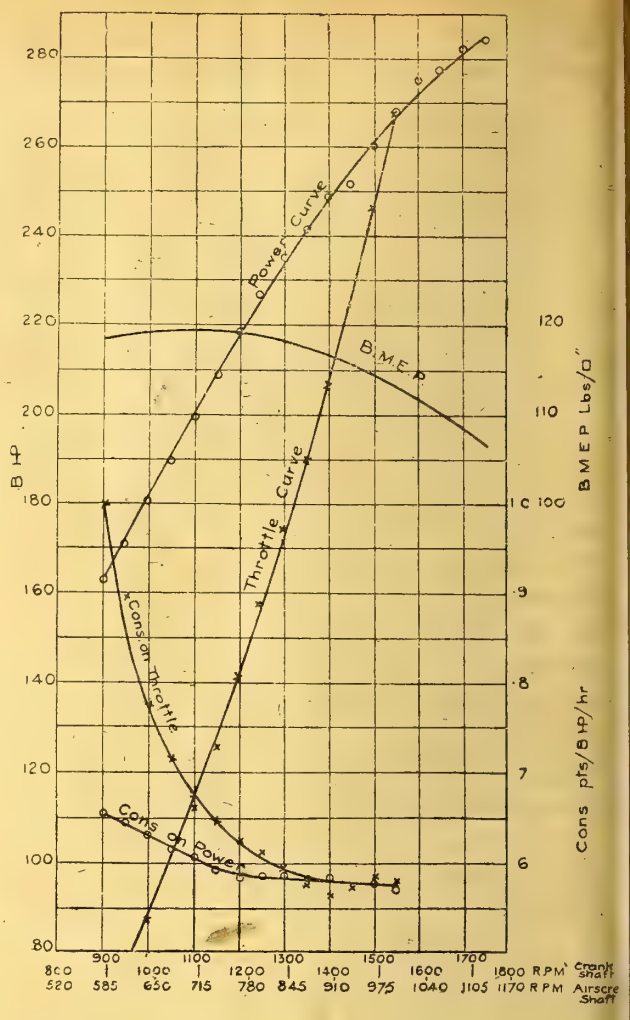
ENGINEERS, LONDON.

"GWYNNE, LONDON."



Power and Consumption Curves of the 180-h.p. Mercédès.

Description of Part.	Number per set.	Average unit weight in lbs.	Weight of complete set in lbs.	Percentage of total weight.
Camshaft and case with half Comprn. gear ...	1	60.00	60.00	6.666
Reduction Gear (large) with airscrew shaft and bearings complete	1	45.00	45.00	5.000
Reduction driving gear on camshaft, complete with bearings and thrust race	1	23.25	23.25	2.583
Base Chamber (top half)	1	103.75	103.75	11.527
Base Chamber (bottom half)	1	113.00	113.00	12.555
Carburetters, complete ...	2	8.00	16.00	1.777
Induction pipes, complete	2	7.25	14.50	1.611
Oil pump, complete	1	12.50	12.50	1.388
Water pump, complete ...	1	9.00	9.00	1.000
Vertical driving shaft, including magneto driving bevels and couplings, etc.	1	12.50	12.50	1.439
Airscrew Hub complete...	1	17.875	17.875	1.986
Magnetos	2	17.25	34.50	3.822
Ignition wiring complete	2	2.50	5.00	·555
Exhaust Manifold	1	19.5	19.5	2.166
Miscellaneous parts			48.958	5.439
Total weight of complete engine			900.00	100.000

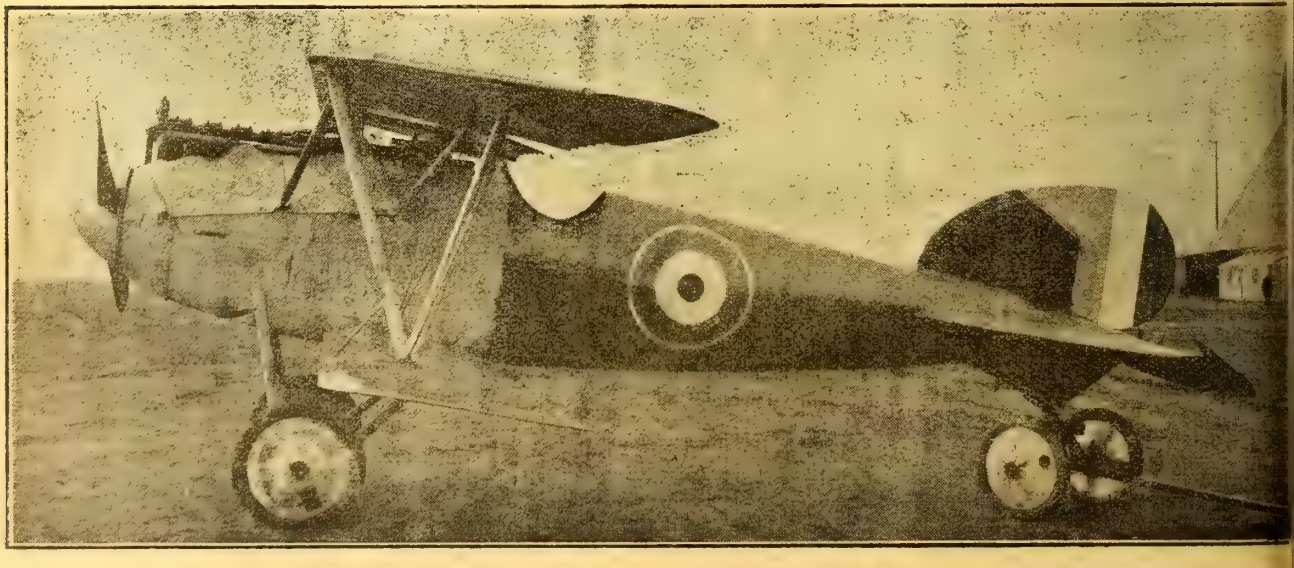


Throttle Power and Consumption Curves of the 240-h.p. Mercédè

SOME USEFUL CONVERSION TABLES.

The Hoffmann Manufacturing Co., Ltd., has issued a sheet extremely useful tables as an aid to converting British standar of weights to French standards and vice versa. The ratios a carried out to several places of decimals, and therefore the tabl should be of considerable value to those who have to transla accurately dimensions from one standard to another.

Readers of The Aeroplane to whom these tables would be use are invited to apply to the Hoffmann Manufacturing Co Ltd., Chelmsford, for a copy free of charge.



The D.V. Type Albatros Chaser from which the 180-h.p. Mercédès engine illustrated in this article was taken.

Where Flying Men are fitted out.

ONE SERVICE



Uniformity of custom and kit; on land, on sea and in the air one organisation only—unity of control centring on one ideal—efficiency. That is the ideal aimed at by the R.A.F. It also summarises the policy of Dunhills; as the R.A.F. have co-ordinated all the efforts and abilities of its two parent services for the better 'strafing' of the Hun so is every idea, every thought and every effort concentrated by the House of Dunhill on the problem of eliminating weather.

The land crab knows nothing of weather inconvenience—it is left to men of the R.A.F., who fight it in its own headquarters, to feel the full fury of its All Highest displeasure.

But Dunhills know and have provided for the worst to the last little detail; and it is just this expert "understanding" knowledge that made them so indispensable to men of the old Air Forces.

The new Force still has the old traditions, the old enemies and now they are one service they still have Dunhills for equipment—the one service that will never fail them.

Call in, if you can, at our well-known "base" in Conduit Street—a few paces from Regent Street—and inspect the full kit. Or, if London is "out of bounds," drop a line for patterns and full details which will be sent gladly on request.

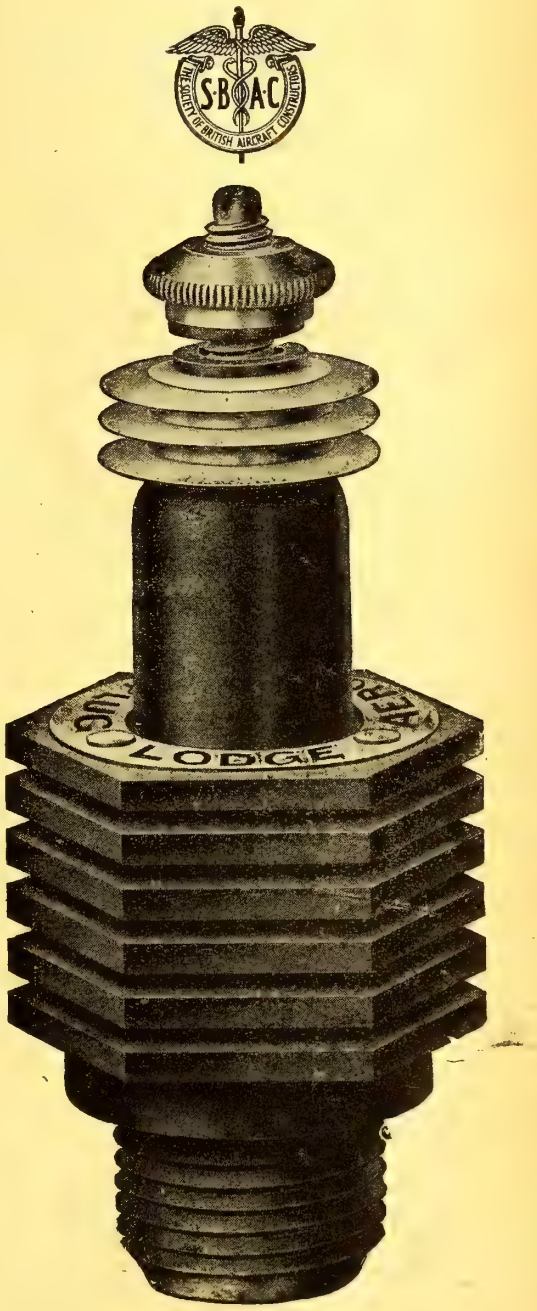
Dunhills

LIMITED.

2, Conduit Street,
Regent Street, London, W. 1.

LODGE

AERO PLUGS



The world's best plugs for both rotary and stationary-cylinder engines.

Complete Output reserved for British and Allied Governments.

MADE IN ENGLAND.

Illustrated Catalogue on Application.

THE LODGE SPARKING PLUG CO., LTD.,
RUGBY.

WITTON

Fuselages
Chassis
Tails
Cowling.

AIRCRAFT

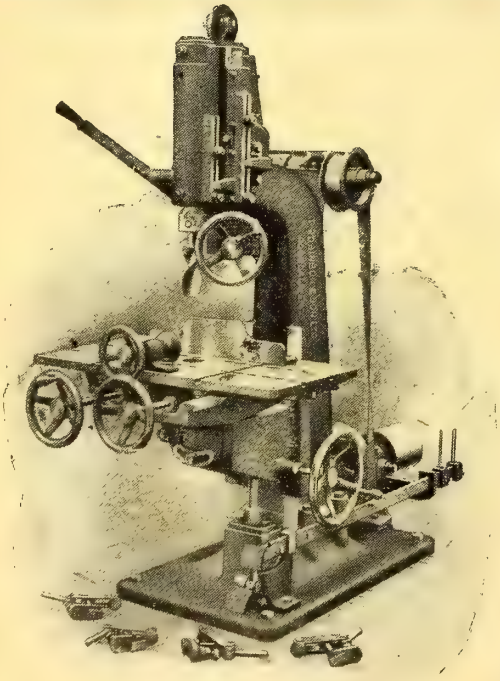
Airscrews
or
Complete
Machines.

Offices:
13, Goodwin Street,
Fonthill Road,
Finsbury Park, N.

Phone: North 2110.

WITTON, WITTON & CO.
Partners { Charles William Wells.
William John Wells.

MAKERS OF THE "WITTON" PIANO.



Vertical Boring and Recessing Machine

Specially designed for accurate work.

For boring, drilling, and recessing the bosses of propellers, etc.; half lapping and mitring the laminations; recessing and drilling the spars, etc.

TYPE PF.

WRITE FOR PARTICULARS.

Thos. Robinson & Son LIMITED
ROCHDALE

THE AIRCRAFT TRADER

MARKET TOPICS.

(Prices are for quantities on usual terms.)

COPPER.—The output of the mines is most satisfactory and is exceeding anything which was expected last January, when the official price was fixed. The majority of producers are making a very good profit. In fact, it is stated that a few are making a profit of 8 cents per lb., and although one or two are agitating for an increase to come into effect on June 1st, there does not appear to be much prospect of their efforts meeting with success.

At one time it was feared that owing to the consumption of Copper increasing so rapidly a shortage was inevitable. This position, however, appears to have considerably improved.

Both buyers and sellers in U.S.A. are holding back until the Government announce their decision on the price question; it is understood that this has been held in abeyance. There is now a strong feeling that the agitation for an advance in price is really being engineered with the object of counteracting any possibility of a reduction in price, and is not intended to secure an advance on the present official price; in any case the majority of producers are under the impression that the present price will remain unaltered.

The price of brazed brass tubes has been reduced 1d. per lb.

TIN.—This market is in a very perplexing condition, prices in the East soaring to an unprecedented height, America having paid more than £500 per ton in order to secure supplies.

The situation has certainly been a little easier during the last few days, due primarily to large shipments having recently been received here; the outlook is, however, very obscure, and it is impossible to foresee what will happen. The authorities are apparently determined to put an end to speculation, and one understands that they are endeavouring to bring the Eastern market down to a reasonable figure.

An order has also been issued by the Ministry dated April 26th, 1918, and the chief points which affect consumers are as follows:—

1. No Tin may be used, except under licence, for the purpose of any manufacture or work except for the purpose of a contract or order for the time being in existence certified to be within Class A in the order of the Minister of Munitions as to priority dated March 8th, 1917.

The following monthly returns to be sent to The Director of Tin Supplies, 1, Metal Exchange Buildings, Whittington Avenue, E.C.3, in the first seven days of each month, commencing May, 1918.

2. All Tin held by them in stock or otherwise under their control on the last day of the preceding month.

3. All Tin purchased or sold and not yet delivered on such last day. The following particulars to be given:—

A. Names of sellers or purchasers.
B. Quantity.
C. Quality.
D. Time and place of delivery.
E. The position of the Tin at date of return.

4. All Tin delivered to them during previous month, and from whom purchased.

5. All contracts or orders existing on the last day of, or entered into during, the preceding month requiring for their execution the use of Tin, specifying the purposes thereof and the quality of the Tin to be used.

No return is required if the purchases or stocks do not exceed 5 cwt.

Comparative Prices.

To-day	£375	0	0
A week ago	£380	0	0
February 14th	£323	0	0
Highest price, 1917	£309	0	0

LEAD.—There are still ample supplies to be obtained for munition purposes, and prices remain unaltered.

STEEL.—Works extensions are still being made and the mills are working at top pressure, especially on shell, shipbuilding and aircraft steels. Good supplies of the latter are now obtainable, and there is no fear of a shortage.

Official prices remain unaltered. It is still difficult to obtain deliveries of H.S. Steel, and although it is a little easier to obtain Cast Steel it is most difficult to obtain certain sizes which are necessary for aeroplane work.

TIMBER.—One understands that the shortage of Timber is being very seriously tackled by the authorities. The situation is regarded with great anxiety by constructors.

It is no use labouring past blunders now. What is wanted immediately is an ample supply of Silver Spruce substitute in quantities sufficient to enable factories to give the country all the machines required during the next six months.

It is understood that a very large quantity of Plywood was used in the construction of a recently captured German aeroplane, and seeing that the Plywood output is gradually increasing, the more extensive use of this material in lieu of Spruce on certain parts of machines is certainly worth serious consideration.

Supplies of Mahogany are fairly easy to obtain. The Plywood situation appears to be improving; in fact, one would be tempted to become very optimistic were it not rumoured that the Government are contemplating controlling production and supplies.

Prices remain unchanged.

FABRIC.—Supplies are very satisfactory. The official prices are as follows:—

36in. wide .....3/1 per lineal yard.
38in. wide .....3/3 per lineal yard.
42in. wide .....3/7 per lineal yard.

A CAUDRON HOLIDAY.

Saturday, the 18th May, was the date for the opening of the British Caudron Co.'s New Sports Grounds at Preston Road, near Harrow. The weather, which is almost as famous as the British Government for doing the wrong thing, turned up trump for once and favoured the function with a perfect day.

Col. Alderman Pinkham, J.P., M.B.E., M.C.C., Chairman of the Willesden District Council, performed the opening ceremony, supported by Mr. R. H. Simpkin, Director and Manager of the London Company. Sir William Ramsay was unable to be present, but wrote to say that he was deeply interested in the project and regretted very much that he could not attend. Mr. A. W. Ramsay, General Manager of the Company, was also unable to be present, being out of town on urgent business.

The afternoon's proceedings were a great success and spoke well for the organising ability of Mr. Ferrier, Chairman of the Sports Committee, and Mr. W. Newman, Secretary of the Sports Committee.

A feature of the afternoon was the double cricket match between the Integral Propeller Company and the British Caudron Company, the two first elevens and the two second elevens, each match being won by the British Caudron Company by 95 to 45—the similar scores being a remarkable coincidence.

The sports were followed by a concert in the evening, which was held in the concert marquee on the grounds, and the programme proved to be excellent, and reflected great credit on Mr. Ross-Oliver, who organised this part of the day's proceedings.

A very pleasant day came to an end about 9.30, when a vote of thanks was proposed to Mr. Simpkin, who, as the only representative of the higher command to have taken an active part in the proceedings, had put in a lot of real hard work in his modest and quiet way, and contributed in no small way to the success of the whole affair.

A number of wounded soldiers were the guests of the Caudron Company during the afternoon, some of whom had to be brought from Harrow, and their transportation would have presented some difficulty but for the assistance of Mr. Arundel, of the Regent Carriage Company, who very kindly lent a large lorry specially fitted up with seats for the occasion.

ELECTRICAL INSTALLATIONS.

Johnson and Phillips, Ltd., of Charlton, London, S.E.7, the well-known electrical engineers and cable makers, have issued an interesting catalogue of special safety truck type switchboards, the use of which practically eliminates any danger of accident and in which accessibility has been studied throughout.

Aircraft constructors who are putting up new plant will be well advised to send for a copy of the catalogue, as it contains many things which are quite new in electrical installations.

INTEGRAL CHANGES.

It is difficult to dissociate Mr. and Mrs. Latimer-Voight from the Integral Propeller Company, Ltd., which they founded in August, 1912, and which went through the same struggles in the early days as so many other pioneer firms. The Integral Company's order book of those days affords amusing reading now when contracts are placed for hundreds of airscrews at a time; in 1912 there was great excitement when an order came for a single propeller (with even chances against it ever being paid for). Mr. and Mrs. Voight can remember their joy when an order came for five propellers from a reputable firm.

Having built up the present huge business (which readers will recollect was visited by the King and Queen last December) Mr. and Mrs. Voight have now retired from the company, which has been acquired by the Aircraft Manufacturing Company, Ltd., M. Chauvière having severed his connection with the firm.



Mr. and Mrs. Latimer-Voight.

Mr. and Mrs. Voight have established the Pegasus Aircraft Company, Ltd., with offices at Totterdown Street, Tooting, S.W.17, whence they will continue the design and manufacture of airscrews.

Mr. Lancelot Saunders, the able works manager of the Integral Company (a brother of Mrs. Latimer-Voight), who joined the firm in 1915 after having fought against the Germans in the successful campaign in S.W. Africa, also retires from the Integral Company.

Various interesting ceremonies took place in connection with the departure of Mr. and Mrs. Voight and Mr. Saunders. The office staff presented Mr. and Mrs. Voight with a handsome pair of old English cut-glass vases, with gold mounts, and a magnificent bouquet for Mrs. Voight. Subsequently the men and women in the works presented Mr. Voight with a beautiful pair of gold sleeve links and Mr. Saunders with a meerschaum pipe. Appropriate speeches were made in each case, and many of those present were deeply affected, for there are few more popular employers in the industry than Mr. and Mrs. Voight and Mr. Saunders.

The "old guard"—those who worked for the firm before the war—were most moved to see their old "bosses" go.

In the afternoon Mr. Voight, who has always been an enthusiastic cricketer, and in his day a good player, captained the Integral Cricket XI. (the committee having generously requested Mr. Voight to lead the men on that occasion) in the league match v. Becks C.C. It was an exciting game, the visitors winning by 16 runs. After the match Mr. and Mrs. Voight entertained the team and committee, as well as the office staff, several of the charge hands, and others to tea on the ground, after which the whole party proceeded to the Kilburn Empire, where Mr. Voight had booked seats. Afterwards there was an all-round leave-taking, Mr. and Mrs. Latimer-Voight being given a hearty send-off. Thus ended a happy but sad day.

AERIAL TRANSPORT IN THE WEST INDIES.

A company has been registered in the British West Indies which one sincerely trusts is only the first of a series of syndicates whose work in life will be to develop commercial aeronautics in the Colonies.

The head offices of this new company, which is registered as the West Indian Aerial Transport Syndicate, Ltd., are at 65, Marine Square, Port of Spain, Trinidad, B.W.I. The company, which is actually in process of formation, will have a capital of 70,000 dollars in 10 dollar shares.

It is intended to start a weekly seaplane service between Trinidad and St. Kitts, calling at all the islands en route, viz., Grenada, St. Vincent, Barbados (depôt), St. Lucia, Martinique, Dominica (depôt), Guadeloupe, Montserrat, and Antigua. Later on it is hoped to establish a seaplane service twice weekly between Georgetown, British Guiana, and Oyster Bay (Florida), calling at a number of islands in the West Indies.

The promoters wish to employ seaplanes able to carry a useful load of five tons at a speed of 100 miles per hour, and it is hoped that it may be possible to get official sanction for the machines to be constructed in and exported from England, a hope which one is afraid will not be realised during the war.

The managing director of the concern, Mr. R. E. Davis, is a nephew of Sir Marcus Samuel, Bart., chairman of the Shell Trading and Transport Co., Ltd., and of Samuel Samuel, Esq., M.P. for Wandsworth, so the new effort will be controlled by one who has considerable and definite connections with England. The further proceedings of the company will be watched with interest.

A BRAVE WATNEY LAD.

From the "Daily Chronicle" of May 28th:—

A modest boy who kept as a secret from his workmates the fact that he saved the lives of two wounded soldiers has just been rewarded, as a result of an anonymous letter. The soldiers were in a canoe which capsized at Weybridge, throwing them both into deep water. Neither could swim. Kenneth Puttock, aged 16, saw the accident and dived after the men. He held up one soldier till a punt containing three women arrived and then brought to the surface the other man, who had gone under for the third time. Both soldiers have since recovered.

It was not till several days afterwards that Puttock's fellow workers heard of the affair through an anonymous letter. Major Gordon Watney and his co-directors then publicly presented their young apprentice with a silver watch in recognition of his bravery.

Puttock, who was formerly a Boy Scout, holds the junior championship of Weybridge Rifle Club, and has also won the Lord Roberts' Medal and other prizes.

WOMEN'S WORK.

Two hundred specimens of parts of engines for aircraft, on which women are doing work of high precision, are among the objects shown at the exhibition, organised by the Ministry of Munitions, which was opened on May 22nd at the Whitechapel Art Gallery.

The exhibition gives a comprehensive idea of the work of women on munitions of war. At the opening of hostilities engineering pessimists were certain that women would not be successful in:—

Non-repetition work; setting tools; gauge making.

Photographs at the exhibition show women doing this and other work, and the display of shining nuts, bars, bolts and cylinders, aeroplane fittings and optical exhibits, proves the success of their labours.

Mr. F. G. Kellaway, Parliamentary Secretary to the Ministry of Munitions, who opened the exhibition, said that he asked one of the officials of the Ministry if it would be true to say that all offensive and defensive measures against the raid on London the other day were carried out by women, except the actual fighting of the machines. The official replied that it would be literally true to say that in every part of the material side at the disposal of our aviators that night the women of this country had made their contribution.

[And why not give them credit for the personnel also?—Ed.]

HELPING THE DISABLED.

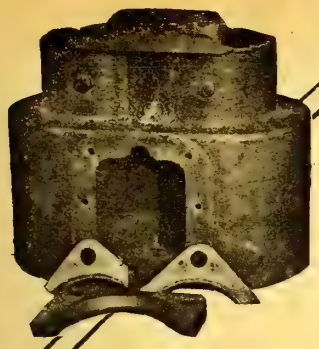
It is good to learn that some who share in the world war which keeps them comfortably, if busily, employed in England are not unmindful of the sufferings of those who have participated in more dangerous if more glorious work on active service. That such consideration exists is proved by a movement which has risen in the works of William Cole and Sons, Ltd., to establish on a National basis a fund with local committees all over the country to administer help to disabled soldiers and sailors who require assistance.

It will readily be appreciated that the official pension which is awarded to a man who is unable to earn his living is inadequate, especially if constant medical attention is necessary.

It is suggested that such a fund should be collected locally in each borough or district, which would be responsible for assisting cases in its own district. In this way it is felt that cases of distress would be more easily and adequately met than if they had to be investigated by a central organisation in a distant part of the country.

It is proposed that all work done in connection with the fund shall be voluntary, in order to assure that every penny subscribed shall go to soldiers and sailors or their dependents. The desire of the promoters is to encourage workers all over the country to subscribe 3d. a week per head. Wm. Cole and Sons, Ltd., have set the ball rolling with a donation of 100 guineas, and their employees *en masse* have agreed to subscribe 3d. a week each.

The management and staffs of aircraft firms who would like to assist the movement are invited to apply to Mr. Allen Cole, at the firm's offices at 235, Hammersmith Road, W.6. He will be pleased to give further particulars concerning the fund.



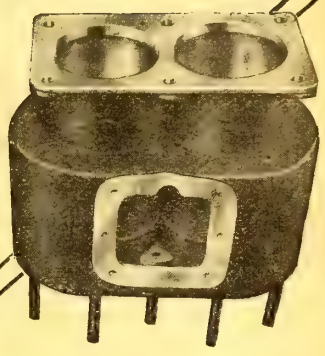
"The best job I have ever had done."

This is what the man to whom these agricultural tractor engine cylinders belonged said, when he came to collect his repair. This is what everyone either thinks or says about the job he sends to:—

THE NEW WELDING Co.

Ask any Engineer

in your neighbourhood where he sends his welding repairs, and send yours to where ninety-nine out of every hundred send theirs—THE NEW WELDING CO. The Engineer has proved for himself that there is no repair service in the country where he can obtain a better job, at a more reasonable price, or in quicker time.



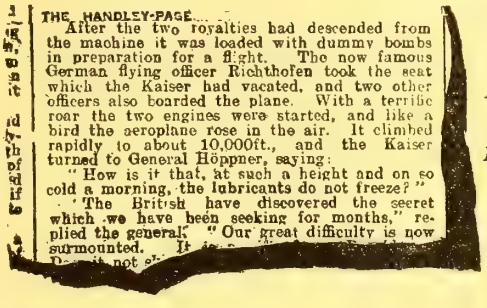
THE NEW WELDING Co., 26, Rosebery Av., London, E.C.1.
Telephone: 5252 Holborn. Telegrams: "Windoneeda, Holb, London."



Kaiser (*log.*): "How is it at such a height on so cold a morning the lubricants do not freeze?"
Gen. Hoppner: "The British have discovered the secret which we have been seeking for months."
Vide "Daily Mail," see above.

A BRITISH FIRM BEATS THE GERMANS

THE SECRET



THE HANDLEY-PAGE...
After the two royalties had descended from the machine it was loaded with dummy bombs in preparation for a flight. The now famous German flying officer Richthofen took the seat which the Kaiser had vacated, and two other officers also boarded the plane. With a terrific roar the two engines were started, and like a bird the aeroplane rose in the air. It climbed rapidly to about 10,000ft., and the Kaiser turned to General Höppner, saying:
"How is it that, at such a height and on so cold a morning, the lubricants do not freeze?"
"The British have discovered the secret which we have been seeking for months," replied the general. "Our great difficulty is now surmounted. It ...

Extract from "Life in Essen." Eye-witness's Account. —"Daily Mail," April 8, 1918.

WAKEFIELD Castrol 'R' MOTOR OIL
Racing)

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

was the lubricant used

Castrol "R" possesses the lowest cold test of any known Aero Engine Oil.

C. C. WAKEFIELD & CO., LTD.
WAKEFIELD HOUSE, CHEAPSIDE, LONDON, E.C.2

C.D.C.

"ULSTER" FANS

FOR ALL PURPOSES.

Forced and Induced Draft on Boilers. Fumes Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. **Hot-Water, Steam, "Ulster" Stoves.**

We Guarantee Success. Our 50 years' experience is at your disposal.

MUSGRAVE & CO., Ltd.,
Manufacturing Engineers,
BELFAST, LONDON, MANCHESTER, CARDIFF.

THE CAMDEN CONSTRUCTION CO., Ltd.

289, HIGH STREET, CAMDEN TOWN, N.W.1.

CONTRACTORS FOR THE ERECTION OF BUILDINGS
FOR THE AIRCRAFT AND ALLIED TRADES
IN
THE MATERIALS AT PRESENT AVAILABLE WHICH CONDUCE TO SPEED

DESIGNS AND ESTIMATES SUBMITTED PROMPTLY.

Aeroplane Engine Manufacturers—
You can depend on ALVASTON perfect WELDING.

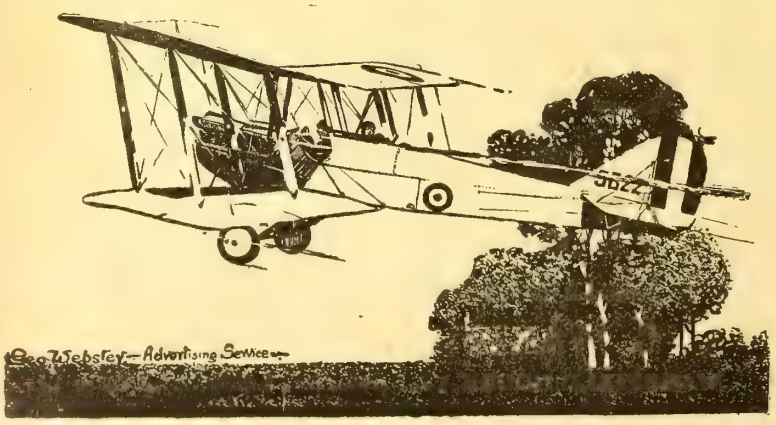
Pistons, Cylinder Jackets, Intricate Pipe Work, etc., in Steel, Copper, Aluminium, Cast Iron, and Alloys.

Our recently increased Capacity and Twelve Years' Experience are at Your Service.

Quotation to Drawing or Sample. Prompt Deliveries.

ALVASTON WELDING CO., ALVASTON, DERBY.

'Phone—1 Alvaston. 'Grams—"Motors, Alvaston"



METAL COMPONENTS
FOR
AIRCRAFT.

Undercarriages
Tail Units
Tubular Framework.

THOMPSON BROS. (Bilston) Ltd.
AERO. DEPT., Bilston, Staffs.

(*Continued from page* 1966.)

A good deal of fighting again took place around our bombing machines. Sixteen German aeroplanes were brought down, and two others were driven down out of control. Two of the enemy's observation balloons were also destroyed.

Three of our aeroplanes are missing.

During the night both our own and the enemy's bombing aeroplanes were active. Over 12 tons of bombs were dropped by us on aerodromes used by the enemy's night-flying machines and on billets at Bray and Bapaume.

All our machines returned. Two German machines were brought down by gunfire behind our lines.

A further two tons of bombs were dropped by our aeroplanes on the chlorine factory at Mannheim, on the Rhine, causing three large fires, and another two tons on the railway stations at Thionville and Karthaus (just south of Trèves), in Germany.

One of our machines failed to return.

At dawn on the 22nd inst. two formations set out on a long-distance raid to bomb the important military triangle at Liége. All machines reached the objective and dropped 22 heavy bombs. Those dropped by the first formation caused three very large fires, which were still burning fiercely three-quarters of an hour later, when the second formation flew over Liége.

Other machines dropped 12 heavy bombs on the railway stations at Metz.

All machines returned.

May 23rd, 10.12 p.m.—On the 22nd inst. artillery work, photography, and bombing were continued by our aeroplanes. Aerodromes used by the enemy's night-flying machines were again attacked, and over 18 tons of bombs were dropped on these targets and on hostile billets.

In air fighting 13 German machines were brought down and two others were driven down out of control. One hostile machine was shot down in our lines by machine-gun fire from the ground.

Three of our aeroplanes are missing.

After dark 11 tons of bombs were dropped by us on hostile aerodromes, the docks at Bruges, and on billets in the Somme area. Several direct hits were obtained on a train, causing it to burst into flames.

In addition, our machines again attacked Mannheim in Germany, and dropped 24 heavy bombs on the chlorine factory, causing two large fires.

The blackened girders of the buildings gutted by the fires started by us in the factory by the bombs dropped on the preceding night were clearly visible in the moonlight.

At the same time, four tons of bombs were dropped on the very important electrical power station at Kreusewald (just east of Saarbrücken). A boiler house was hit by one bomb, and another bomb caused a large cloud of steam to arise from one of the buildings.

All our machines returned.

At about 11 a.m. on the 23rd inst. the Metz-Sablon railway station was heavily bombed by our machines. Bombs were seen to burst on the engine sheds and the railway.

Hostile anti-aircraft gunfire was considerable, but all our machines returned safely.

May 24th.—9.37 p.m.—The long spell of fine weather came to an end about 11 a.m. on the 23rd inst. Before this hour several reconnaissances were carried out by our aeroplanes, and eight tons of bombs were dropped on aerodromes in the neighbourhood of Tournai, used by the enemy's night-flying machines, and on hostile billets.

Three German machines were brought down in air fighting and two others were driven down out of control.

Three of our aeroplanes are missing.

During the night, in spite of a very high wind, our machines dropped over seven tons of bombs on billets in the neighbourhood of Péronne, Fricourt, and Bapaume, and on hutments and woods in the Somme area.

All our machines returned.

On the 24th inst. nearly a ton of bombs was dropped on the railways and factories at Hagendingen, 12 miles north of Metz. When over their objective, our machines were attacked by hostile scouts, and the enemy's anti-aircraft gunfire was considerable.

All our aeroplanes, however, returned safely.

May 26th, 8.50 p.m.—On the 25th inst. flying was only possible during a few fine intervals. Advantage was taken of these periods to drop over 300 bombs on billets in the neighbourhood of Armentières and Merville, on an ammunition dump at Varssenaere (south-west of Bruges), and on Bruges Docks.

In air fighting, eight hostile machines were brought down, and two were driven down out of control. Another German machine was shot down by machine-gun fire from the ground.

None of our aeroplanes is missing.

During the short period of the night in which bombing was possible, over six tons of bombs were dropped by us on Péronne, Bapaume, and Maricourt (north-west of Péronne).

All our aeroplanes returned.

May 27th, 9.45 p.m.—On the 26th inst. little flying was possible till the evening owing to low clouds and a dense mist. Four tons of bombs were dropped by us on targets in the neighbourhood of Armentières and Fricourt. Six hostile machines were brought down in air fighting.

None of our aeroplanes is missing.

On the 27th inst. Bensdorf railway station was bombed by our aeroplanes. Twenty heavy bombs were dropped, and bursts were seen on the railway sidings. Our bombing machines were heavily attacked by hostile scouts over their objectives, and one of our machines was seen to go down under control.

All our other aeroplanes returned safely.

* * *

War Office Communiqués.

May 24th.—The G.O.C. Salonika reports :—

The Naval Contingent of the Royal Air Force carried out a successful raid on Drama aerodrome on the evening of May 12th. One enemy machine was observed in flames, and two others enveloped in smoke.

On the same day a hostile aeroplane was driven down near Livunovo (Upper Struma Valley). Two other machines were driven down west of Lake Doiran on May 15th and one near Hudova (Vardar Valley) on May 21st.

The aerodrome at Hudova was bombed by our machines on May 24th. All bombs were observed to burst near their objectives, and obvious damage was caused to the hangars.

May 24th.—The G.O.C. Palestine reports :—

On May 23rd three enemy aeroplanes were brought down by our machines, two falling in the vicinity of Nablus (Shechem) and one near Latrun (within the British lines).

May 25th.—The G.O.C. British Forces in Italy reports :—

Since the 18th instant the Royal Air Force has carried out numerous reconnaissances far behind the enemy lines and collected much useful information. Many bombs have been dropped on enemy hutments and dumps.

In air fighting since May 18th 24 enemy aeroplanes have been destroyed. In addition, one enemy observation balloon has been burnt. During this period we have not lost a single machine.

* * *

Home Command Communiqués.

May 22nd.—Police reports show that the total casualties so far ascertained as having been caused by the air raid on the night of May 19th in all districts visited by hostile aeroplanes are as follows :—

Killed	44
Injured	179

THE CASUALTY LIST.

NAVAL.

Reported May 23rd.

Previously reported Missing, now Presumed Killed.—Scott, Flt. Sub-Lt. G. B. G., R.N.
Winn, Flt. Sub-Lt. J. H., R.N.
Hough, Flt. Sub-Lt. J. E. C., R.N.
Morang, Prob. Flt. Officer G. H., R.N.

Died of Injuries.—Jones, F. R., Air Mech., 1st Gr., F.13285.

MILITARY.

Reported May 22nd.

Killed.—Kohnstamm, Capt. N. M. J., Manch. R., attd. R.F.C.

Previously reported Missing, now reported Prisoners in Turkish Hands.—Mills, Lt. A. S., Yeo., attd. R.F.C.
Taylor, Sec. Lt. W., E. Lan. R., attd. R.F.C.

Canadian Force.—Missing.—Pelletier, Lt. C. A., Can. Eng., attd. R.A.F.

Reported May 23rd.

Previously reported Missing, now reported Killed.—Cann, Sec. Lt. L., R.F.C.

Reported May 25th.

Previously reported Died of Wounds as Prisoner, now reported Prisoner in Austrian Hands.—Gore, Sec. Lt. F. D. C., R.F.C.

Previously reported Missing, now reported Prisoner in German Hands.—Blake, Sec. Lt. H. P., R.F.C.

Previously reported Missing, now reported Prisoner in Bulgarian Hands.—Gaynor, Sec. Lt. H. F., Lond. R., attd. R.F.C.

Australian Force.—Killed.—Buckland, Lt. W. A. J., F.C.
Ralfe, Capt. H. D. E., F.C.

Reported May 27th.

Previously reported Missing, now reported Prisoners in German Hands.—Caldecott, Sec. Lt. R., R.F.C.
Dougall, Sec. Lt. H. F., R.F.C.
McKeown, Sec. Lt. C. J. W., R.F.C.
Thomas, Sec. Lt. G. P. F., Durh. L.I., attd R.F.C.

Canadian Force.—Killed.—Allison, Lt. J. O., W. Ont. R., attd. R.A.F.
Kelly, Lt. M. S., Man. R., attd. R.A.F.
Martyn, Lt. E. M., Cent. Ont. R., attd. R.A.F.

Accidentally Killed.—Robinson, Capt. G., M.C., Can. Cav., attd. R.A.F.

Missing.—White, Capt. P. R., E. Ont. R., attd. R.A.F.

CASUALTIES AMONG N.C.Os. AND MEN.
THE DATES ARE THOSE OF THE OFFICIAL LIST.
PREVIOUSLY MISSING, NOW REPORTED KILLED.

MAY 17th.—K.R.R.C. attd. R.F.C.—Edwards 4937 G. A. Walthamstow, E.)

WOUNDED.

MAY 17th.—A.F.C.—Bailey 518 A. G.

* * *

Reported May 24th.

The following officers, who were prisoners in Germany, have arrived in Holland for internment :—

Castle, Sec. Lt. W. F. L., R.F.C.; Chaloner, Capt. Hon. T. W. P. L., Yorks R., attd. R.F.C.; Ellis, Lt. W. B., A.S.C., attd. R.F.C.; Harvey, Lt. E. B., Lond. R. and R.F.C.; Kerr, Lt. C., R.F.C.; MacIntyre, Sec. Lt. D. H., Arg. and Suthd. Highrs., attd. R.F.C.; Tomson, Lt. W. J. M., R.F.C.; Toone, Lt. J. W., R. Ir. Regt., attd. R.F.C.; Van Nostrand, Lt. C. I., R.F.C.

Reported May 28th.

The following soldiers, who were prisoners in Germany, have arrived in Holland for internment :—

R.F.C.—Johnston, 2458 R. G.; Topcliffe, 1746 G.

AIR FORCE.

Reported May 22nd.

KILLED.—Bannister, Sec. Lt. Q. W., R.A.F.
Barker, Sec. Lt. W. J., R.A.F.
Farnham, Sec. Lt. J. H., R.A.F.
Fleming, Sec. Lt. A., R.A.F.
Girdlestone, Lt. H. W., R.A.F.
Greenwood, Lt. L. A., R.A.F.
Hames, Sec. Lt. C. R., R.A.F.
Van Staden, Sec. Lt. L. J., R.A.F.

WOUNDED.—Collier, Sec. Lt. H. W., R.A.F.; Collins, Sec. Lt. H. J., Yorks Hus. (T.), attd. R.A.F.; McLean, Sec. Lt. W. E., R.A.F.; Severne, Sec. Lt. A. de M., R.F.A. (T.), attd. R.A.F.; Wesley-Sequi, Sec. Lt. H., R.A.F.; Wilton, Sec. Lt. G. N., R.A.F.

MISSING.—Carr, Sec. Lt. C. V., D. of Well. R., attd. R.A.F.; Colville-Jones, Capt. T., R.A.F.; Harrington, Lt. H. B. D., Lond. R. (T.F.) and R.A.F.; Nelson, Lt. H. L., R.A.F.; Tysoe, Lt. C. G., R.A.F.

Reported May 23rd.

KILLED.—Boardman, Sec. Lt. A. G., R.A.F.
Bowden, Sec. Lt. N., Notts and Derby (T.), and R.A.F.
Davies, Sec. Lt. R. L. J., R.A.F.
Derrick, Sec. Lt. L. J., E. Kent R., attd. R.A.F.
Gillett, Flt.-Sub-Lt. H. R., R.A.F.
Masters, Sec. Lt. A. E., R.A.F.
Rosevear, Capt. S. W. (D.S.C.), R.A.F.
Whalley, Lt. W. G., R.A.F.

WOUNDED.—Lee, Sec. Lt. C. R., R.A.F.; McDunlop, Sec. Lt. A., Sco. Rif. and R.A.F.; McGregor, Sec. Lt. J. H., R.A.F.; Phillips, Capt. T., Welsh R. and R.A.F.; Walker, Sec. Lt. H.B., R.A.F.; Young, Sec. Lt. F., R.A.F.

MISSING.—Brown, Sec. Lt. A. C. G., R.A.F.; Dawes, Sec. Lt. A. F., R.A.F.; Hamilton, Sec. Lt. G., R.A.F.; Hampton, P. R., R.A.F.; Steel, Lt. A. E., R.A.F.; Whyte, Lt. C. B., R. Scots, attd. R.A.F.

Reported May 24th.

KILLED.—Browne, Sec. Lt. H. G., R.A.F.
Browne, Lt. H. J., R.A.F.
Dexter, Lt. E. I., Northd. Fus. and R.A.F.
Herron, Lt. K. C., Essex Yeo. (T.F.), attd. R.A.F.
King, Lt. W. H., Essex R. (T.F.), attd. R.A.F.
Marrable, Lt. E. D., R.F.A., attd. R.A.F.
Robinson, Lt. R., R.A.F.
Williams, Sec. Lt. A. E. G., R.A.F.

WOUNDED.—Doran, Sec. Lt. C. F. G., R.A.F.; Harmer, Sec. Lt. R. H., R.A.F.; Harrison, Sec. Lt. W. L., R.A.F.; Mann, Sec. Lt. F. A. W., R.A.F.; McLean, Sec. Lt. R. N., R.A.F.; Pascoe, Sec. Lt. J. H., D.C.L.I. and R.A.F.

MISSING.—Cartmell, Lt. G. M., R.A.F.; Chadwick, Capt. G., Manch. R. (T.F.) and R.A.F.; Hickey, Lt. L. C., R.A.F.; Skinner, Sec. Lt. R. L. G., R.A.F.

PRISONERS.—Hopewell, Lt. D. C., R.A.F.; MacPhee, Lt. G. G., H.L.I. (T.F.) and R.A.F.; Parkinson, Lt. G. R. J., R.A.F.

Reported May 25th.

KILLED.—Carthew, Sec. Lt. J. H., R.A.F.
Fairbairn, Sec. Lt. D. C., R.A.F.
Hepworth, Lt. A. M., R.W. Surr., attd. R.A.F.
Hill, Lt. R. B., R.A.F.
Lankin, Lt. C., R.A.F.
Owen-Holdsworth, Sec. Lt. J. P., R.A.F.
Rowden, Maj. C. R., Worc. R. and R.A.F.

WOUNDED.—Berlyn, Lt. R. C., R.A.F.; Glazier, Sec. Lt. G. J., R.A.F.; Harrison, Sec. Lt. E. C., R.A.F.; MacLeod, Sec. Lt. E. L. H., Worc. R., attd. R.A.F.; Montgomerie, Sec. Lt. H. S., R.A.F.; Weatherley, Sec. Lt. J. A., R.A.F.

MISSING.—Bright, Sec. Lt. R. E., R.A.F.; O'Neill, Sec. Lt. T. M., R.A.F.; Slipper, Lt. R. A., R.A.F.; Smith, Lt. N. A., Manch. R., attd. R.A.F.; Wright, Sec. Lt. B. W., R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Coward, Sec. Lt. J. B., R.A.F.

Reported May 27th.

KILLED.—Attewell, Sec. Lt. J. C., R.A.F.
Baird, Sec. Lt. J. D., R.A.F.
Gliddon, Lt. R. A., Middx. R., attd. R.A.F.
Holthouse, Sec. Lt. A. R., R.A.F.
Lowrie, Sec. Lt. V. W. V., R.A.F.
Macintyre, Sec. Lt. D. P., R.A.F.
Wylie, Sec. Lt. J. R., R. Dub. Fus. and R.A.F.
Young, Sec. Lt. F. J., R.A.F.

WOUNDED.—Dallas, Maj R. S., R.A.F.; Lovick, Sec. Lt. C. E., R.F.A. (S.R.), attd. R.A.F.; Peters, Lt. N., Northd. Fus., attd. R.A.F.; Mellings, Capt. H. T., R.A.F.; Stanners, Sec. Lt. H., R. Muns. Fus., attd. R.A.F.; Thomson, Lt. J., R.E., attd. R.A.F.

MISSING.—Birch, Lt. S., R.A.F.; Clark, Capt. C. C., R.A. and R.A.F.; Johnston, Sec. Lt. R. L., R.A.F.; McDonald, Capt. R., R.A.F.; Wood, Sec. Lt. J. C., R.A.F.

Reported May 28th.

KILLED.—Homersham, Sec. Lt. R., E. Yorks. R. (T.F.), attd. R.A.F.
Hunt, Sec. Lt. C. B., R.A.F.
Ipswich, Viscount, Lt. W. H. A., C. Gds. and R.A.F.
Joyce, Sec. Lt. N. R., R.A.F.
Parry, Sec. Lt. S., R.E., attd. R.A.F.
Reece, Capt. F. B., R.E., attd. R.A.F.
Woodhouse, Sec. Lt. P. W., R.A.F.

WOUNDED.—Edwards, Sec. Lt. A. G., R.A.F.; Gardner, Lt. D. (M.C.), Dragoon Gds., attd. R.A.F.; James, Sec. Lt. M. L., R.A.F.; Rolandi, Sec. Lt. V. F. A., R.A.F.; Spurr, Sec. Lt. N. F., R.A.F.; Walton, Sec. Lt. J. L., R.A.F.; Windsor, Capt. J. S. (M.C.), S. Wales Bord. and R.A.F.

MISSING.—Cuttle, Lt. G. (M.C.), R.F.A., attd. R.A.F.; Leckie, Sec. Lt. G. A., R.A.F.; Newton, Sec. Lt. F., R.A.F.; Ratcliffe, Sec. Lt. T., R.A.F.; Whitford-Hawkey, Lt. A. M., R.A.F.

PERSONAL NOTICES.

NAVAL.

DEATHS.

CARTMEL.—Lt. George Musgrove Cartmel, R.A.F., reported missing on April 6th and now officially reported to have been killed in action on that day, aged 19, was the eldest son of Mr. G. E. Cartmel, coroner for Westmorland, and Mrs. Cartmel, of The Meadows, Kendal. He was educated at Rossall and joined the R.N.A.S. from the school O.T.C. in June of last year. After undergoing training in England and France, he was gazetted flight sub-lieutenant in the Royal Navy in December of last year. He was wounded in action on March 16th, and had only just returned to duty when he was killed. He was a good all-round athlete and won his colours at school for both cricket and football.

HALL.—Lt. Frederick Vincent Hall, R.A.F., formerly Sub-Lt., R.N.A.S., was killed on active service on May 15th. He was the only child of Mr. and Mrs. F. W. Hall, of Elmcroft, Muswell Hill Road, N., and 89, Charterhouse Street, E.C. He was 20 years of age. Mr. Hall was awarded a medal by the citizens of Dunkerque for bravery in defending them from hostile aircraft on May 2nd, 1917, and was wounded whilst flying over the enemy a few days later.

HYDE-THOMSON.—Lt.-Col. Douglas Hyde Hyde-Thomson, R.A.F., formerly Wing Comdr., R.N.A.S., was killed at a south-eastern aerodrome on May 21st.

At the inquest it was stated that he landed at an aerodrome to remedy some slight engine trouble. On resuming his journey he had risen about 50 feet, and in making a turn did not have manœuvring room, with the result that his machine nose-dived to earth.

Douglas Hyde-Thomson was born on January 18th, 1891, at Coalville, Leicester. He passed his tests for his aviator's certificate on a Wight seaplane at Calshot, and qualified again at a later date on a Bristol biplane at Chingford, his certificate, No. 1245 being dated May 15th, 1915.

In 1911 he was a lieutenant R.N. on H.M.S. "Swiftsure," and later joined the Naval Wing R.F.C. When the R.N.A.S. came into separate being on July 1st, 1914, he was a Flight Lieutenant, and was promoted Flight Commander on October 13th, 1914.

The Navy List of 1914 shows him as at the Central Air Office for torpedo duties with aircraft. It was he who was responsible for all the early experiments with torpedo-carrying seaplanes, and for their ultimate success. Though a specialist on torpedo work he later devoted his attention to wireless, and did much to bring the wireless branch of the R.N.A.S. to its present high state of efficiency.

On July 28th, 1916, he was promoted Squadron-Commander, and was promoted Wing Commander on December 31st, 1917.

In Douglas Hyde-Thomson the Navy has lost a most valuable officer, who by his intense keenness, his unusual foresight, and his unlimited faith in the future of Naval aviation has done much to bring the Naval side of British aviation to the pre-eminent position which it now occupies despite years of systematic dis-

REPETITION WORK,

LIGHT PRESSINGS, STAMPINGS & PIERCINGS,

IN ALL METALS.

REYNOLDS BROS., 13-15, Branston St., BIRMINGHAM.

W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

TO ENSURE ECONOMY AND EFFICIENCY

SPECIFY

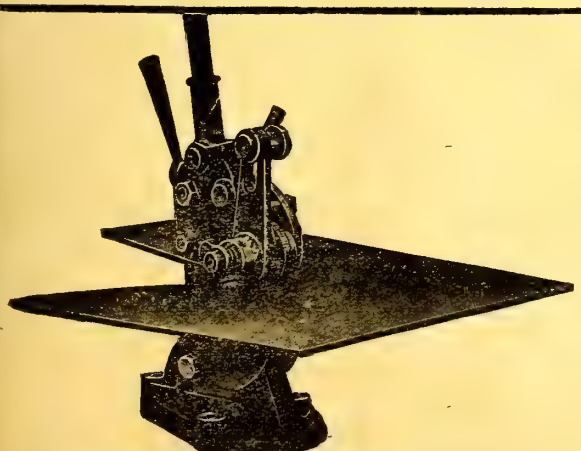
VICTOR **FLEXIBLE BACK**

BLADES



EVERY BLADE COUNTS.

VICTOR SAW WORKS
(CANADA) LIMITED,
283, WEST STREET, FINSBURY CIRCUS, E.C. 2.



'TANGENT'

HAND

SHEET SHEARING MACHINE

PATENT.

SELF-FEEDING, FAST CUTTING

STEEL, 3/16" SOFTER METAL, 1/4."

Write for Descriptive Pamphlet and Prices.

MONTGOMERY, SMITH & Co., Ltd.,

PATENTEES AND MANUFACTURERS,

KEYNSHAM, SOMERSET.

couragement by senior naval officers and of dislike by their juniors. His great personal charm won for him many friends, and his evident mental capacity and service ability equally won for him the respect and appreciation of all who served with him.

His work in developing torpedoes and wireless in the R.N.A.S. by itself entitles him to a place of honour in the history of the Flying Services, quite apart from the good work which he did in importing into the R.N.A.S. all that was best in the manners and customs of the Royal Navy. He was a Naval officer of the finest type, an educated gentleman of broad outlook unspoiled by routine, and as such he can ill be spared.

Commander Hyde-Thomson was the son of Mr. and Mrs. Robert Donald Thomson, of Pool House, Groby, Leicestershire. He was to have been married in June this year. To his parents and fiancée all will offer their sincere sympathy.

* * *

Flt. Lt. Osborn Groves, R.N., arrived in Switzerland from Heidelberg Camp, Germany, on May 16th. Lt. Groves while in Germany made three attempts to escape into Holland. He was caught, however, each time and sent to punishment camps, where his treatment was very bad, particularly while he was at Holzminden.

MILITARY.

Deaths.

GEIDT.—Lt. C. N. Geidt, Cameron Highlanders, and R.A.F., who has been killed in an aeroplane accident in Egypt, was 23 years of age, and the son of the late Mr. B. G. Geidt, I.C.S., of Bayshill House, Cheltenham.

GLANVILLE.—Capt. Hugh Fanshawe Glanville, West India Regt., attd. R.A.F., has died from injuries sustained while flying on the Scottish east coast. He was 33 years of age, and a son of the Rev. R. O. F. Glanville, of South Brent, Devonshire.

Capt. Glanville was born in 1884, and had his commission in the West India Regiment in January, 1905. Transferring to the R.F.C. in 1913, he reached the rank of Flt. Commander in Sept., 1915.

HEARD.—Lt. Edward Terence Heard, R.A.F., formerly of King Edward's Horse, and of Bahr-el-Ghazal, Sudan, who has died from injuries received while flying on May 17th at Weeley, Essex, was 28 years of age, and only son of the late Edward Heard and of Mrs. Heard, of 31, Dorset Square, N.W.1. He had his "wings" in October last year.

HOUGHTON.—Lt. Frank Magens Caulfeild Houghton, R.A.F., who was accidentally killed while flying on May 6th, was the eldest son of Mr. Frank Edwin Caulfeild Houghton, of the Old Hall, Dorrington, Shrewsbury, was born in 1895, and was educated at Magdalen College School, Oxford, and Denstone College, Staffs. Leaving school on August 1st, 1914, he received his first commission in the Shropshire Light Infantry the following September, afterwards transferring to the Army Cyclist Corps, and in May, 1916, he became an observer in the R.F.C., in which force he served continuously for 18 months in France, obtaining his wings in 1917.

HOWELLS.—Sec. Lt. G. J. Howells, R.F.C., previously reported missing and now presumed killed, was before joining the R.A.M.C. (from which he afterwards obtained a commission) head dispenser to a leading firm of Cheltenham chemists.

LACEY.—Lt. F. P. Sleigh Lacey, A.S.C., attd. R.F.C., who died in hospital on March 29th of pleuro-pneumonia, was 26 years of age.

LANGLEY.—Lt. John Basil Robert Langley, R.A.F., who was killed on May 15th, was 29 years of age and was the eldest son of the Rev. John and Mrs. Langley, of North Wraxall, Wilts. He came over with the 19th Alberta Dragoons in the First Canadian Contingent, with which he served in France, and subsequently joined the R.F.C. For seven months he was an artillery observer at the front. He came home and, showing extraordinary facility in handling an aeroplane, became almost at once an instructor in special flying. It was in this capacity that he met his death. Mr. Langley had always maintained that it was possible for a particular make of machine to roll to the left, and in support of his contention had already twice successfully performed this evolution, but on the third attempt his machine nose dived and crashed. He was considered one of the most accomplished and careful pilot instructors in the Royal Air Force, and was universally beloved. He was married to Lorna, daughter of Sir Oliver and Lady Lodge, on July 28th last, and he leaves a son a few weeks old.

MACINNES.—Brig.-Gen. Duncan Sayre MacInnes, C.M.G., D.S.O., R.E., who was killed in action on May 23rd, was born in 1870, and was the son of the late Donald MacInnes, of Hamilton, Canada, a member of the Senate.

He entered the Army in 1890, and served with the Ashanti Expedition of 1895-6, for which he received honourable mention and the Star. He had a great deal of Staff service in the South African War of 1899-1902. He was in the Defence of Kimberley, and was mentioned in despatches in 1900 and again in 1902, and for his services received the D.S.O., the Queen's medal with three clasps, and the King's medal with two clasps.

Having graduated at the Staff College, Camberley, he was appointed a General Staff officer in the Department of the Director of Military Training at the War Office, and was also one of the War Office members of the Royal Engineer Committee. Subsequently he was appointed a member of the Directing Staff of the Staff College, an appointment he was holding when the present war broke out.

He saw much service in France in the present campaign. He went to the front in the early days of the war, and was wounded in November, 1914.

In the following year he served as an Assistant Director in the Department of Military Aeronautics at the War Office, and in 1916-17 was Director of Aircraft Equipment. For his services he received the C.M.G. As Director of Aircraft Equipment Gen. MacInnes had to face a most arduous task. It fell upon him to evolve from the formless muddle of 1915 some regular scheme for organising and increasing aircraft production simultaneously. All those who served with him at that period bear witness to his unflagging zeal and to the amount of personal effort which he expended. If hard work on the part of one man could have produced the necessary aeroplanes and engines Gen. MacInnes would assuredly have obtained them. Despite an infinity of natural obstacles and personal hindrances he succeeded in effecting remarkable increases in output, and, at the same time, he won the personal affection of all those who worked with him or under him.

The intensity of his efforts nearly broke down his health, but before he left the War Office to take a command in the field he had done much spade work which afterwards proved of high value. Full recognition was given to his services when, at a dinner given to him on his departure, the present Air Minister, then only recently appointed Director-General of Aircraft Production, referred in the highest terms to the worth of his achievements in laying the foundations of aircraft production on a thoroughly sound basis. His name deserves to live in the history of military aeronautics as one of those who helped the R.F.C. out of its blackest days.

Gen. MacInnes, who married in 1902 the daughter of Mr. F. Wolferstan Thomas, leaves a widow, one son, and one daughter.

MITCHELL.—Sec. Lt. E. P. H. Mitchell, Border Regt., attd. R.A.F., who was accidentally killed whilst flying abroad on May 7th, was the only son of Dr. and Mrs. Mitchell, Ambleside. He was 20 years of age, and was an instructor.

MORGAN.—Lt. Frederick J. Morgan, Royal Fusiliers and R.A.F., who died on May 16th of wounds received in action on May 14th, was the only son of Mr. and Mrs. F. Morgan, 46, Beauval Road, East Dulwich, S.E.

ROWDEN.—Maj. C. R. Rowden, M.C., Worcester Regt. and R.F.C., whose name appeared in the list of killed in the Casualty List of May 25th, met his death in an unexplained accident at a South Coast aerodrome.

He had seen much active service, and was regarded by all who served with him as a first-class pilot and a very able commanding officer. He was both popular with and respected by officers and men alike, and his death has been deeply felt by his squadron.

Maj. Rowden was gazetted Second Lieutenant to the 5th Reserve Battalion the Worcester Regt. with seniority of Nov. 11th, 1914.

SANKEY.—Lt. Cecil Martin Sankey, M.C., The Buffs, attd. R.A.F., whose death was announced last week, was educated first at Dumpton House, Broadstairs, and later at Westminster School, where he was in the O.T.C. He received a commission in Queen Victoria's Rifles before he reached the age of 18.

After serving in that regiment for several months, he received from the Headmaster of Westminster (Dr. Gow), in January, 1916, a nomination to Sandhurst. There he reached the rank of Serjeant in the following April, and passed out in August, being then gazetted to The Buffs (E. Kent Regt.). He went to the front in Sept., 1916, and on Jan. 27th, 1917, was awarded the Military Cross for conspicuous gallantry and devotion to duty while leading his men in a successful attack against the enemy at the battle of Locs, receiving the decoration from the King some months later at Buckingham Palace. Last December he was transferred to the R.A.F., and only a fortnight ago qualified as pilot.

THOMSON.—Capt. George Edwin Thomson, D.S.O., M.C., R.A.F., who was accidentally killed while flying in England on May 23rd, in his 21st year, was the only son of Mr. James Thomson, of Rangoon, Burma. He was educated at Glenalmond and Glasgow University, where he was studying with a view to a Civil Service appointment. On the outbreak of war he was gazetted second lieutenant in the K.O.S.B., and in 1916 he became attached to the R.F.C. In August, 1917, he went out to France, and in recognition of his services was appointed flight commander in November of the same year. In March, 1918, Capt. Thomson returned to England, having brought down 21 German aeroplanes, and having throughout displayed exceptional gallantry on patrol. He was awarded the M.C. during the same month, and in April he won the D.S.O. In May he was appointed second in command of a T.D.S., and only a few weeks later he met his death on a cross-country flight. Capt. Thomson was a keen aviator and an excellent Rugby player and swimmer.

METAL FITTINGS

FOR LATEST

"AVRO" and D.H.

MACHINES.

Immediate Deliveries.

D.H. BOMBCELL PARTS, FUSELAGE AND UNDERCARRIAGE FITTINGS.

AVRO MAIN PLANE, WIRING PLATES.

PRESSWORK AND WELDING of every description.

ALWIN ENGINEERING Co., Ltd.

'Phone— KINGSTON 2412. **LUTHER ROAD, TEDDINGTON.** Telegrams— ALWIN, TEDDINGTON.



Suits Aviation

THE

"Air-Velope"

Built up on entirely new scientific lines.

The details of which we shall make known shortly.

POSITIVELY COLD, WIND & WET PROOF.

As sketch, with Fur Collar,

£10 10s.

Robinson & Cleaver Ltd.

The Linen Hall, Regent Street, London, W.

AIRCRAFT DEPARTMENT



WORLD'S LARGEST MANUFACTURERS OF ALL KINDS OF ENGRAVED METAL GOODS

British Metal (Kingston) Ltd

Kingston-on-Thames

DIALS & INSTRUCTION PLATES MADE IN ANY METALS, IVORY, IVOROID, BONE, ETC. ANY QUANTITIES, WORDING, DESIGN, SIZE, SHAPE OR COLOURS.

COMPLETE SHEET METAL AIRCRAFT COMPONENTS

RIVETED, SWEATED, BRAZED OR WELDED

R.E., F.E., B. & D, B.E., C-D-E. SE DE H.

RESIDENT A.I.D. EXAMINER

When Fitting-up your Works AND OFFICES or Contemplating Alterations

SEND TO

THE CAMDEN CONSTRUCTION CO., LTD.

289, HIGH STREET, CAMDEN TOWN, N.W.1,

and a Representative will wait on you, submit a scheme and guarantee a time of completion.

Propeller, Engine and other Cases a Speciality.

DISTANCE NO OBJECT.

TOUCHE.—Sec. Lt. Eric Percy Johnstone Touche, R.A.F., killed in an aeroplane accident on May 17th, aged 21, was the only son of Mr. Percy Touche, of Simondium, South Africa, and grandson of the late Edward Touche, M.D., Staff Surgeon, 92nd and 83rd Regiments, who rendered distinguished service in the Indian Mutiny, and a great-grandson of the Rev. John Edward Touch, formerly minister of Kinnoul, Perthshire, another of whose sons was the late General John Gray Touch. (The name which, in Scottish usage, had become Touch was restored to its original spelling of Touche by Royal Licence.)

Eric Touche volunteered for service in South Africa in 1914, when in his 18th year. He served first in Egypt, then in France, where he was wounded in the head. In March, 1917, he received a commission in the 3rd Essex Regiment, and returned to France, but was invalided home with trench fever in June, 1917, and volunteered for the R.F.C. in October, 1917. He had just qualified as pilot and received his wings.

VON POELLNITZ.—Maj. H. W. von Poellnitz, Lincolnshire Regt. and R.A.F., whose death was announced last week, was educated at Repton, where he was in the shooting team for four years and captain for two years. From there he passed into Sandhurst in 1910, where he was captain of the cricket eleven.

He received his commission in 1911 in the 2nd Lincolnshire Regt., and went to Gibraltar in January, 1912, and to Bermuda in January, 1914. In both these places his company won the Rifle Cup. He went to France in November, 1914, was wounded in April, 1915, and, on his recovery, joined the R.F.C. in October.

He obtained his wings on January 20th, 1916, and went to France in May. He flew over the Somme battlefields from July, 1916, to April 18th, 1917, obtained his flight in October, 1916, and was made major and squadron commander on July 2nd, 1917. He took his squadron to another front last January.

On May 10th he met with a motor accident, and died on the following day. He was a good sportsman all round, an excellent rider and shot, and good at all games. It was rumoured some time ago that he had been drowned, and great relief was felt by his many friends in the R.F.C. when this story was contradicted.

As a leader of men, as a fighting man, and as an organiser he displayed marked ability, and his death is a great loss to the Service whose high reputation he did so much to build up and maintain.

ENGAGEMENTS.

ELLIS—MACKENZIE.—The marriage will take place on Saturday, June 1st, at the Chapel Royal, Savoy, at 2, of Lt. S. Howard Ellis, Northumberland Fusiliers and R.A.F., eldest son of Mr. Howard Ellis, of Auckland, New Zealand, and Mary, daughter of the Hon. Sir Thomas Mackenzie, K.C.M.G., High Commissioner for New Zealand, and Lady Mackenzie. There will be no reception, but all friends are cordially invited to the church.

LANE—HILL.—The engagement is announced between Lt. J. A. B. Lane, Hussars, attd. R.F.C., son of the late Mr. F. G. Lane, of the Stock Exchange, and Mrs. Lane, of 2, Weymouth Street, W., and Kathleen Hill, only daughter of Mr. and Mrs. F. H. Hill, of Ilkley and Bradford.

BIRTHS.

GILL.—On May 11th, at Merton House Nursing Home, Reading, to Cherrie (*née* Burke), wife of Donat Gill, Lt. R.E., attd. R.A.F., a son (Peter Donat).

ROWBOTHAM.—On May 16th, at 5, Rayleigh Road, Basingstoke, to Coralie (née Malet Veale), wife of V. S. Rowbotham, Lt. R.F.A., attd. R.A.F.—a son.

* * *

The Earl and Countess of Limerick have received news that their only son, Capt. and Flt. Comdr. Viscount Glentworth, Warwick Yeo. and R.A.F., has been missing since May 18th.

* * *

It is reported that Capt. T. S. Sharpe, Gloucester Regt., attd. R.A.F., is wounded and a prisoner in German hands.

AIR FORCE.

DEATHS.

BEVINGTON.—Sec. Lt. Colin Corry Bevington, R.A.F., who was killed whilst flying in Yorkshire on May 22nd, was the youngest son of Alex. and Margaret Bevington, of Silverwood, Pyrford, near Woking. He was 18 years of age.

FLOWER.—Lt. Charles Renyon Flower, R.A.F., who has been killed in action, was the eldest son of Mr. and Mrs. H. Flower, of 3, Orrisdale Terrace. He was 21 years of age.

GRAHAM.—Sec. Lt. W. J. R. Graham, R.A.F., met his death on May 17th while flying at Montrose. When at a height of 1,000 ft. the aeroplane took a nose dive to the earth, and the aviator was killed instantaneously. Deceased, who was an experienced flyer, was 20 years of age. He belonged to Canada.

HOUGHTON.—Lt. Frank Magens Caulfeild Houghton, R.A.F., who was accidentally killed on May 6th, was the son of Frank Edwin Caulfeild Houghton, of Dorrington, Shrewsbury.

MORGAN.—Lt. Edward Percival Morgan, R.A.F., who died of wounds received in action on May 23rd, was the son of Mr. E. Strachan-Morgan, of 56, Boundary Road, N.W.

MOSSMAN.—The sudden collapse of a wing while flying over Lincolnshire resulted in the death of Sec. Lt. Charles Frederick Mossman, R.A.F. An inquest on the body of deceased, who was 20 years of age, and belonged to North London, was held on May 15th, when it was shown that the wing broke off at a height of 1,000ft. The machine crashed on the marsh near the sea coast, and the aviator was found dead among the wreckage. A verdict of accidental death was returned.

PRESTON.—Sec. Lt. Harry Dennis Preston, R.A.F., who was killed on May 14th whilst flying in Wiltshire, was the youngest son of Robert K. Preston, of Chicago. He was 22 years of age.

TRUBRIDGE.—Lt. Roland W. Trubridge, R.A.F., who died of wounds on May 6th, was the son of Mr. and Mrs. H. W. Trubridge, formerly of Gosforth, Newcastle-on-Tyne.

ALLEN.—On the 17th inst., at Chiddingfold, Surrey, Elizabeth Jane, wife of John Philip Allen, R.A.F., the eldest son of Mr. and Mrs. T. Y. Allen, 22, Flodden-road, Camberwell.

ENGAGEMENTS.

GRAHAM—GASKELL.—The marriage arranged between Mr. Robert C. Graham, R.A.F., and Miss Florence C. Gaskell will take place quietly at St. Matthew's Church, West Kensington, on Tuesday, June 4th, at 1 p.m. All friends are invited to the church.

SCARAMANGA—BEVAN.—An engagement is announced between Capt. G. J. Scaramanga, R.A.F., elder son of Mr. and Mrs. John Scaramanga, of 259, St. James' Court, and Ursula Constance, younger daughter of Mr. and Mrs. O. G. Bevan, of Margery Wood, near Reigate.

MARRIAGES.

DE PUTRON—BESTOW.—On May 18th, at St. Stephen's, Norbury, Lt. Owen Washington de Putron, R.A.F., son of the late Capt. Beaumont de Putron and Mrs. de Putron, was married to Phyllis Patricia, second daughter of Mr. and Mrs. Frederick Wm. Bestow, of Thornton Heath.

TYNDALE-BISCOE—CRONE.—The marriage arranged between Capt. Harold L'Estrange Tyndale-Biscoe, R.A.F., eldest son of the Rev. C. E. and Mrs. Tyndale-Biscoe, Srinagar, Kashmir, and Elsie May, eldest daughter of Maj. J. S. and Mrs. Crone, Wivenhoe, Coatham, Redcar, Yorks, took place quietly at Christ's Church, Coatham, on Saturday, May 25th.

VARLEY—GOUGH.—On May 10th, at Wolverhampton, Lt. Rowland Varley, R.A.F., second son of Mrs. K. Varley, of Wolverhampton, was married to Ileene Josephine, second daughter of Mr. and Mrs. J. Gough, of Southampton.

VILLIERS—PERCY.—The marriage arranged between Maj. Oliver Villiers, D.S.O., R.A.F., son of the late Rev. H. M. Villiers and of Mrs. Villiers, and Aleen Judith, second daughter of the Rev. and Mrs. H. V. Heber Percy, of Leasingham Rectory, Sleaford, Lincolnshire, is arranged to take place at St. Paul's Church, Knightsbridge, on the 6th of July, at two o'clock. No invitations will be sent, but all friends will be welcomed.

BIRTHS.

ANNS.—On May 23rd, at Ravenswood, East Molesey, the wife of Captain H. F. Anns, R.A.F.—a daughter.

ECKERSLEY.—On May 18th, at 42, Hawes Road, Bromley, the wife of Capt. P. P. Eckersley, R.A.F.—a son.

PRITCHARD.—On May 19th, at 1, Sloane Court, S.W., the wife of John Edward Maddock Pritchard, R.A.F., of a son.

FOREIGN COMMUNIQUES.

FRANCE.

MAY 21ST.—On May 19th during the daytime our chasing pilots brought down six German aeroplanes. Nine other enemy machines fell in their own lines badly damaged after fighting.

PYROMETERS

For Heat Treatment of all parts of

Aeroplanes and Aeroplane Engines.

Radiation Pyrometers, catalogue P. 17.

Thermo-couple Pyrometers and Electrical Resistance Thermometers, catalogue P. 19.

POST FREE ON REQUEST.

FOSTER INSTRUMENT CO.,

LETCHWORTH, HERTS, ENG.

Terry Spanner Sets.

ACCURATELY cut double ended or folding patterns—in THIN good quality, well tempered STEEL. Stand hard service—take up little room.



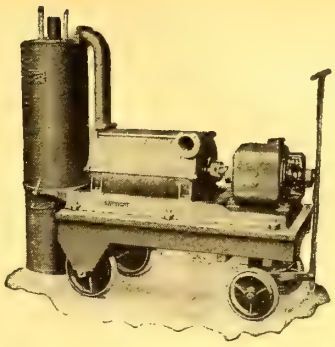
We can accept orders for War Work. Write us now

HERBERT TERRY AND SONS, Limited, The Spring and Press—work Specialists, — REDDITCH, England.

Telephone No. 61 Redditch (4 lines.)



(8)



For cleaning Fuselages

Workshops, stores, blowing dust out of motors, etc., the Sturtevant (factory type) Portable Turbine Cleaner and Blower offers many advantages over ordinary methods of cleaning—speedily takes up dust and refuse.

Send us your Enquiries, we shall be pleased to assist you. Pamphlet W1208 sent on request.

Sturtevant

Engineering Co., Ltd.,
147, Queen Victoria St., London, E.C.4.

PETROL TANKS SUMPS, BONNETS COWLS, &c.

and other
Light Pressed & Stamped Work for Aeroplanes.

JOSEPH SANKEY & SONS, LTD.

Hadley Castle
WELLINGTON
Shropshire

J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.
Great Charles Street, Birmingham.

1336

On the same day and during the following night 25,000 kilogrammes (about 25 tons) of bombs were dropped by our bombarders on the cantonments at Rosières en Santerne, the aviation grounds of Villeselve and Vauvillers, and the railway stations of Péronne, Nesle, Chaulnes, etc. A big fire broke out at Rosières.

In addition, during the same night, some Italian machines bombarded the railway station of Montcornet and the aerodrome of Ville aux Bois, where great damage was observed.

Army of the Orient.—Allied aviators bombarded the stations of Angista and Hadji Beljik on the Seres-Drama line, the aerodrome of Resna (to the north of Lake Prespa), and the encampments of Gransi (on the Devoli). In the course of these air fights one enemy machine was forced to descend.

May 22nd.—Army of the Orient.—In spite of the unfavourable weather, the Allied air squadrons bombed the depôts of Demirhissar and Ochrida.

Enemy aeroplanes having been reported by our signal stations to be proceeding in the direction of Paris, the alarm was given at 10.40 p.m. last night. The various means of defence were brought into action. A violent artillery barrage was put up, and our flying men went up. A certain number of bombs were dropped in various suburban districts, and a few casualties and material damage are reported.

None of the enemy machines succeeded in reaching Paris. One of them was hit by artillery fire from the entrenched camp of Paris, and was brought down in flames north of the capital. The "All clear" was sounded at one a.m.

May 23rd.—On May 20th an enemy aeroplane was brought down in an air combat. It is confirmed that eight German machines were destroyed by our pilots, one on May 15th, another on May 16th, and six on May 19th. In addition two machines were brought down by the anti-aircraft defences on May 20th and May 21st.

On May 20th and the following night our bombing squadrons dropped 17,000 kilogrammes (17 tons) of projectiles on the region of St. Quentin, Noyon, and Tergnier, the stations of Péronne, Rosières, Nesles, and the aviation grounds of Villeselve.

Two large fires followed by explosions were observed at St. Quentin and at Nesles.

On May 21st and the following night our aeroplanes dropped 30,000 kilogrammes (30 tons) of bombs on the same regions, causing numerous fires. Cantonments and stations in the region of the Ville Aubois, Hirson, Le Cateau, Aulnoye, etc., received during the same period 11,000 kilogrammes (11 tons) of explosives.

Italian aviation crews took part in these expeditions.

May 24th.—Army of the Orient.—Allied aviators bombed the aerodrome of Hudovo and the enemy encampments to the northwest of Nonte and in the region of Ochrida.

May 25th.—During the days of May 22nd and 23rd four enemy aeroplanes and two captive balloons were driven down by our fire. It is confirmed that five more German machines were destroyed in aerial combats during May 16th, 19th, and 21st.

Between May 21st and May 23rd inclusive, our bombarding squadrons dropped 30 tons of projectiles on railway stations, cantonments, and aviation grounds in the enemy zone. Fires were observed in the railway stations of Montescourt (south of St. Quentin) and Hirson (south of Maubeuge), and serious damage was apparently caused in the aerodrome at Cappy (south-east of Albert).

May 26th.—Army of the Orient.—Allied aviators dropped over 13,000 kilogrammes (about 13 tons) of explosives on the enemy's establishments. In the course of the air fighting on the 25th two enemy machines were forced to descend.

GERMANY.

May 21st.—During the last three days 59 enemy machines and three captive balloons were brought down. Lt. Loewenhardt obtained his 24th and Corp. Rumey his 20th and 21st victory in the air.

May 22nd.—During the night of May 20th-21st one of our bombing squadrons destroyed extensive French munition depôts near Blargie.

Lt. Mekhoff achieved his 27th aerial victory, and Lt Puetter his 23rd and 24th.

May 23rd.—On the Lys battlefield three American aeroplanes, amongst others, were brought down yesterday.

The enemy aerial attacks against Belgian territory, which have increased in frequency of late, have inflicted heavy damage

STOP PRESS

The Air Board modification, "Additional Tubular Bracing fitted to Tail Plane" (*Part No.* 11458, *&c.*) that has just been issued can be obtained as a Complete Unit from

THE PULVO ENGINEERING CO., LTD.,

10, Dane Street, London, W.C.1.

WRITE US.



Telephone— WILLESDEN 2297 (2 lines).
Telegrams— ARNOTHARRI. LONDON.

SPECIALISTS IN ALL
DE HAVILLAND
METAL FITTINGS
UNSURPASSED FOR
PROMPT DELIVERY.

Hythe Rd., WILLESDEN JUNCTION, N.W.10.

"A & H" SMALL PARTS TO THE RESCUE.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AEROPLANE GENERAL SUNDRIES, LTD.

OWING to an adverse legal decision we are no longer able to use our well-known block embodying the initials of our name———but ---

We can still supply you with

A.G.S. Parts

All kinds of small Turning and Repetition Work carried out at short notice.

Telephone—
Holborn 4959.

Telegrams—
Zeppiskout,
Holborn,
London.

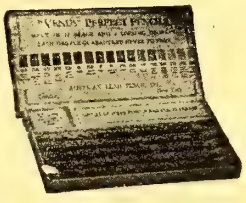
Registered Office—
**FULWOOD HOUSE,
FULWOOD PLACE
HIGH HOLBORN,
LONDON, W.C.**

VENUS PENCILS

FOR sketching, topographic maps, mechanical drafting, and all technical uses, military, naval and civil, there is one pencil which is famous as being the standard by which all pencils are judged. This is the VENUS. VENUS pencils are perfect for every purpose. More VENUS' are sold than any other drawing pencil. Quality counts!



Specify VENUS and look for the distinctive VENUS finish.



17 Black degrees from 6 B (softest) to 9 H (hardest), and hard and medium copying.

FREE!
This Trial Box with Five VENUS Drawing Pencils and Venus Eraser sent free!

Please enclose **3d.** in stamps to cover postage and packing.

WRITE FOR IT!



American Lead Pencil Co.
173/5, LOWER CLAPTON ROAD, E.5

AEROPLANE

RUBERY, OWEN & Co
TELEPHONE No 87. DARLASTON
TELEGRAMS ROOFS DARLASTON
TRADE MARK
DARLASTON. SOUTH STAFFS

ACCESSORIES

7 Years' Experience.

The Guardian Angel Parachute



E. R. Calthrop's Aerial Patents, Ltd.
Eldon St. House, Eldon Street, London, E.C.2

Telephone (2 lines)—
LONDON WALL 3266 & 3267.

Telegraphic Address—
"SAVEMALIVO, AVE, LOND ON.

and losses on the civilian population. No military damage has been caused.

By successful bomb-dropping large enemy munition depôts to the north-west of Abbeville were destroyed. Bombs were also dropped on Paris.

May 25th.—On May 23rd the crew of an observation aeroplane, Lt. Eisinmonger and Serjt. Gund, shot down four machines out of a chain of six British one-seater battleplanes

AUSTRIA.

May 25th.—Over 20 enemy aeroplanes dropped bombs on Feltre. One civilian was killed and eight wounded. Otherwise only slight damage was caused. Field-pilot Temp. Officer Kiess, one of our most successful pilots, was brought down in aerial battle and was found dead.

ITALY.

May 21st.—Our own and British aviators brought down eight enemy aeroplanes; a ninth machine, hit by the artillery, fell in flames.

On Saturday our seaplanes reconnoitring in the Upper Adriatic had a desperate fight with a number of enemy machines about 15 miles west of Pola. One enemy machine was brought down and one of ours had to alight on the sea after being hit. To prevent its falling into the hands of the enemy it was destroyed by the pilot, who was rescued by another of our seaplanes.

Yesterday, in the Southern Adriatic, our seaplanes bombed simultaneously the military works at Durazzo and those at Lagosta (Dalmatia) with visibly good results. Despite intense anti-aircraft fire, all our machines returned uninjured to their bases.

May 22nd.—The activity of our own and Allied aviators was considerable. Eight enemy machines, two of which were accounted for by anti-aircraft batteries, were brought down.

May 22nd.—During the day of May 20th a British air squadron bombarded the seaplane station and submarine base at Cattaro. A fire was observed in buildings near the landing-stages and in the barracks. In spite of intense anti-aircraft fire and the action of enemy machines, which gave chase, the British squadron returned undamaged to its base.

May 23rd.—Our own and Allied aviators brought down three enemy aeroplanes and forced two others to land. The enemy aviation camp near Motta di Livenza and troops and wagon transport on the march on the Asiago Plateau were bombarded with effective results. Major Baracca has gained his 32nd victory.

May 24th.—Intense aerial activity; five enemy machines were brought down. The aviation camps at Feltre and Motta di Livenza were successfully bombarded.

May 25th.—British aviators bombed enemy troops in the lines of communication on the Asiago Plateau. Five machines were brought down, and a sixth forced to land.

May 26th.—Our own and Allied planes, flying low, fired with machine-guns on and bombarded enemy troops, batteries, and billets in the Asiago basin and along the Piave.

May 27th.—Aerial activity was partially limited by bad weather. Eight enemy aeroplanes were brought down.

On May 24th our hydro-aeroplanes bombed the enemy hangars at Lagosta, in the island of Curzola (Adriatic) with visibly good results. Despite intense anti-aircraft fire they all returned uninjured to their base.

U. S. A.

May 24th.—It is established that our aviators shot down two hostile machines on May 21st.

BELGIUM.

May 21st.—We engaged in destruction fire as well as counter-battery work. Our aeroplanes and balloons lent valuable assistance in observing for our batteries.

The enemy indulged in long-range fire, and bombs were dropped by his aviators on our cantonments in the back zone. We engaged in reprisals on similar objectives in the enemy's zone.

May 22nd.—As a reprisal for bombardments carried out by enemy aeroplanes our aviators dropped some bombs last night on sheds in the railway station of Zarren and on sheds at Laffinghe and Leke.

BULGARIA.

May 22nd.—In the Monastir region German aviators brought down three enemy machines, which were destroyed by the fire of our artillery.

TURKEY.

May 19th.—In the Aegean one of our aeroplanes attacked the enemy artillery positions in the island of Meis, and the good effects of this attack were observed. Despite the enemy's counter-action, our aeroplane returned undamaged.

May 22nd.—Our aviators attacked with success enemy camps on the sector of the Jordan west of Jericho and the Wadi-Auja.

May 23rd.—There is continuous lively aerial activity

May 25th.—Our aeroplanes dropped a quantity of bombs on a rebel camp in the neighbourhood of Kerak (east of the Dead Sea).

THE USE OF

NAYLOR'S

Aero Varnishes

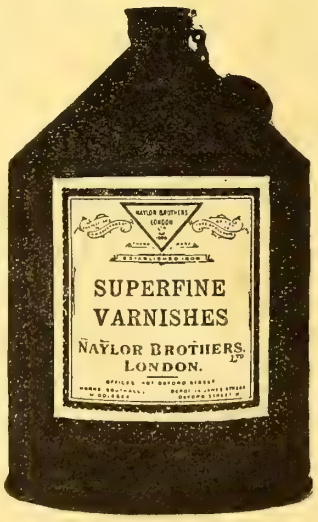
WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.

Some Specialities for Aero Work.

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.



NAYLOR BROTHERS (London) Ltd.

Contractors to all Government Departments.

Offices: 407/9, OXFORD ST., LONDON, W. **Also at SOUTHALL.**

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.

FIRST IN 1880 FOREMOST EVER SINCE.



PROMPT DELIVERY AGAINST "A" CERTIFICATE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,

NEW CROSS, LONDON, S.E.

Bowden.

Controls AND Cables FOR Aeroplanes

Suitable for all possible purposes.
Quotations submitted on application.

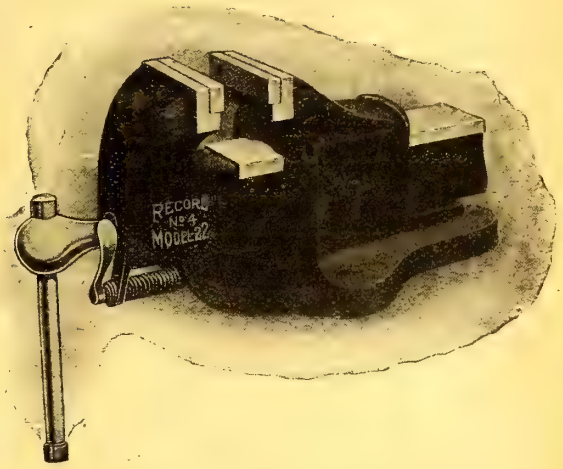
Note Address:—

THE BOWDEN BRAKE CO., LTD.,
TYSELEY, BIRMINGHAM.

Tyseley

A.H.B.

BENCH VICES



PROMPT DELIVERIES.

C. & J. HAMPTON, LTD.,
SHEFFIELD.

TELEGRAMS: "VICES, SHEFFIELD."



Class 6 Imperial Acetylene Welding Plant.

OXY-ACETYLENE PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

Telegrams— "EDIBRAC, PHONE, LONDON."

Telephone— VICTORIA 3540 (3 Lines)

ELECTRIC CABLES

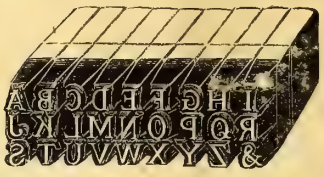


E. KALKER & CO.,
COVENTRY.

CONTRACTORS TO WAR OFFICE, ADMIRALTY AND AIR BOARD.
'Phone—East 3331 (2 lines). Wires—Dayhur, Phone London.



STEEL STAMPS





And MARKING ROLLERS for all descriptions of Aircraft Parts.
BRANDING IRONS. Inks and
STENCIL PLATES. Brushes.

JOHN MEERLOO & SONS,
CLEVELAND STREET, MILE END, LONDON, E. 1.

A.G.S. WASHERS
Turn Buttons.
Eyelets.
Washers.

Wire Work.

THIMBLES

UNION NUTS & NIPPLES.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

THE MIDLAND MOTOR CYLINDER Co. LTD.
SMETHWICK Nr. BIRMINGHAM
TELEPHONE—289 SMETHWICK TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED,

Telegrams:
"Cellulate, London." 8, WATERLOO PLACE, S W.1. *'Phone: Regent 4015.*
Also at Spondon, Derby; and Maybury Gardens, High Road, Willesden Green. N.W.10.
(Telephone: Willesden 2380.)

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

THE
BURTON AIRCRAFT
and Manufacturing Co., Ltd.

WOOD and METAL PARTS and UNITS Covering and Doping.

WORK GUARANTEED.
ENQUIRIES INVITED.

—PARK STREET,—
BURTON-ON-TRENT.

Phone—554 BURTON-ON-TRENT.
Telegrams—"PLANES, BURTON-ON-TRENT."

THE
Eastbourne Aviation Co. LTD.

ESTABLISHED 1911



AEROPLANE CONSTRUCTORS
Contractors to the Admiralty



TELEGRAMS: Aircraft EASTBOURNE
PHONE: 1176

'Phone 3373 Museum.

Aircraft

National Aircraft Mfg. Co., Ltd.,
15, Drummond Crescent,
Seymour St., Euston Rd., London, N.W.1.

TIMBER

SILVER SPRUCE
ENGLISH ASH
WALNUT & MAHOGANY



JOSEPH OWEN & SONS
Limited
BOROUGH, LONDON, S.E.1,

Telephone: Hop 3811. Telegrams: "Bucheron Sedist."

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
47, VICTORIA ST., S.W.

HIGH ST., MERTON, and HENDON

HIDE GLUES

FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

'FEARLESS' ENGINE CLEANING BRUSHES

As used by the R.F.C.



Send Trade Card for FREE SAMPLE.

FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD., LONDON——N.16.

Auster LTD

for AUSTER-TRIPLEX SHIELDS AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

BIRMINGHAM: Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

Lang Propeller LTD.

Contractors to the Admiralty and War Office.

WEYBRIDGE, SURREY.



THE

Beverley Engineering Works

Aeroplane Cylinders

Clerget Le Rhône Gnôme



WILLOW AVENUE, BARNES, LONDON. 'Phone: Putney 478

SALMSON AERO-ENGINES

(Canton-Unné System).

All enquiries should be addressed to

THE DUDBRIDGE IRON WORKS, Ltd.
STROUD,
GLOUCESTERSHIRE.

London Office:
87, *Victoria Street, S.W.*1,

The Air Navigation Co., Ltd.

BLERIOT & SPAD,

ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director,

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

HOPTON & SONS

(HOPTONS)

GEORGE STREET, EUSTON SQUARE, LONDON, N.W. 1 & UNION WORKS, MARKET HARBORO', LEICESTERSHIRE.—

PIONEER TIMBER MERCHANTS AND BENT TIMBER MANUFACTURERS OF

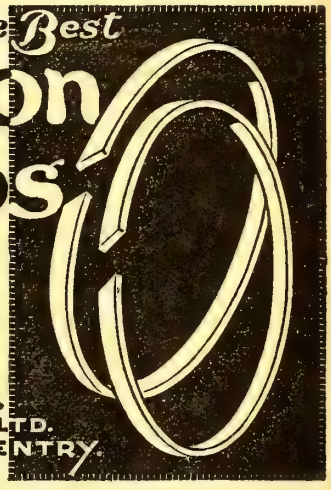
AEROPLANE PARTS

Telephones—
Museum 496.
Mkt. Harboro 13.

ESTABLISHED
1840.

Telegrams—
Hoptons, Eusquare, London.
Hoptons, Mkt. Harboro.

The **Best** **Piston Rings**



Scientifically designed. Made from high tensile cast iron and hammered to give an even radial distribution of pressure. Gastight. Sizes up to 30 in. diam.

***The* BRITISH CHUCK & PISTON RING CO. LTD.**
***Holbrook Lane,* COVENTRY.**

STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK

J. B. GUTHRIE & SON

(JOHN J. GUTHRIE)

30, ST. MARY AXE, LONDON

TELEGRAMS—BUSIRIS LED, LONDON. E.C.3.
TELEPHONE—AVENUE 1432.

Aeroplane Steel Sheets

as supplied by us to

The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

SMETHWICK, BIRMINGHAM

Telegraphic Address:
"Bernico," Birmingham.

Telephone No.:
224 Smethwick.

The Camden Construction Co., Ltd.

Manufacturers of

WOOD PARTS and UNITS for AEROPLANES.

DELIVERIES GUARANTEED UNDER PENALTY.

289, High Street, Camden Town. N.W.1.



THE POOLE AVIATION CO.
POOLE, DORSET.

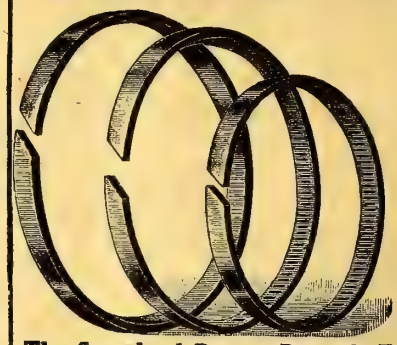
Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.

Telephone No. 2149.
Telegrams—"Ocean," Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Don Road, Sheffield.

Y.E.S. Telegrams: Y.E.S., LEEDS.
Y.E.S. Telephone: 8927 CENTRAL.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'EATONIA' Process.)

Y.E.S. 'AERO' BRONZE
(Under A.I.D. Inspection.)

PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3′ 6″ long.

THE MOST DURABLE YET PRODUCED.

SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, LTD.,
WORTLEY, LEEDS.

Y.E.S. Y.E.S.

CHANDELIER CHAIN
FOR ALL PURPOSES.



Dozens of Sizes. Buy from Actual Makers.

Also all kinds of
PRESSINGS, STAMPINGS & PIERCINGS.

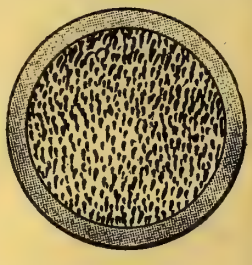
SMITH AND DAVIS, LIMITED.
BRASSFOUNDERS, BIRMINGHAM.

THAMES BANK (BLACKFRIARS) IRON Co., Ltd.
THE
Upper Ground St.
LONDON, S.E.

SPECIALISTS IN
HEATING AND VENTILATING
Factories, Hangars and Doping Shops.

TELEPHONE: HOP 763.
TELEGRAMS: "HOT-WATER FRIARS, LONDON."

ANTOL CASE HARD



Harden your Screws and Gauges with ANTOL.
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C. 1

Turning, Milling, Drilling, Grinding TO FINE LIMITS
IN ALL METALS
For Aircraft and Engines.

BLUMFIELD, LTD.,
70, LOWER ESSEX ST., BIRMINGHAM.

NO HASTY PROMISES, BUT PUNCTUAL DELIVERIES.
V.G.R.

NOTICE TO AEROPLANE WORKS.

SUPPLIES OF 'CROID' LIQUID GLUE.

The necessary additional plant having been obtained, the output of "CROID" Liquid Glue for Aircraft Construction, etc., has now been largely increased, and delays in the despatch of supplies will not, it is anticipated, arise from shortage, as has lately been the case.

THE IMPROVED LIQUID GLUES COMPANY, LTD
Great Hermitage Street and Bushell Street, London, E.1.
Telephone: Avenue 3178. Telegrams: Exoroiden, 'Phone, London.

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 6912. E. H. Godbold, Director
GODBOLDS

AEROPLANE STAMPINGS
IN 3 PLYWOOD.
Perfect cutting. Sample posted free.
SMALL PARTS UP TO 12 ins. by 4 ins.
A. W. ROSS, 20, HERTFORD RD., KINGSLAND RD., LONDON, N1.

FREDK. WARD
— FOR —
Aero Engine and Gun Gear Parts
ALSO PATTERN AND JIGS.
ALLSOP ST., UPPER BAKER ST., N.W.
Phone: Paddington 4743.

NAME PLATES.
WE SPECIALISE IN EVERY DESCRIPTION OF NAME PLATES IN METAL, VORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

PEGAMOID BRAND LEATHER CLOTH.
The Best Waterproof Covering for Railway, Tramway, Aeroplane, Motor Boat, Cushions, Seats, etc.
Sole Manufacturers: **NEW PEGAMOID LIMITED,** 134, Queen Victoria St., London :: :: E.C.4.
Telegrams—Pegamoid, Phone, London.
Telephone—City 9701 (2 lines). Cables A B C 5th Edition and Private.

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: **Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work.** Well-equipped Welding and Brazing Plant.
Enquiries to **P.D.V. AIRCRAFT COMPANY, Ltd.,**
Offices: **Princes Street, Richmond, Surrey.**
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

BRAZING AND SILVER :: :: SOLDERING.
J. W. KING,
36, ST. JOHN'S SQ.
LONDON,
E.C.1.
TELEPHONE - - CITY 5238.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade **MENDINE** Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars.
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE ROYAL AIR FORCE.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

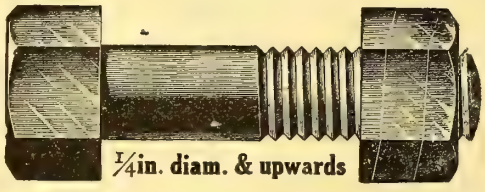
PLYWOOD

IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

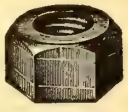
(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅜in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

Bowden Wire Ltd.
TRADE MARK
London

BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.
Victoria Road, Willesden Junction, N.W. 10.
Established 1897.

MISCELLANEOUS ADVERTISEMENTS.

CIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS. in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions, Contracts, etc., 1/6 per line. For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1.

PATENTS.

iE & ROWLINGSON, Chartered Patent nts (Consulting Engineer, Mr. S. E. e, A.M.Inst.C.E.), 27, Chancery Lane, don, W.C. Tel. 332 Central.

ry Skerrett (H. N. Skerrett, A.I.A.E., Mech.E., Associate I.E.E., Fellow of the tered Institute of Patent Agents) Patents, gns and trade marks.—24, Temple Row, mingham.

SITUATIONS VACANT.

lified Instructors required by civilian flying ol to train military pupils.—State hourage machines flown to Box No. 3630, THE PLANE, 166, Piccadilly, W.1.

ited at once for work on Handley Page nes in aircraft factory, London, N.W., a ber of aeroplane erectors and assemblers; ne nacelle assemblers, and viewers on final ion. There are also vacancies for sheet l workers for petrol tanks and cowling, ersmith for pipe work, and panel beaters. district rate and war bonus paid in all s. No one on Government work or living than 10 miles away will be engaged.—e, Box No. 3556, THE AEROPLANE, 166, adilly, W.1.

Engine Fitters required, must be used to hauling Gnome engines. Good wages . No one residing more than 10 miles y or engaged on Government work need y.—Box No. 3609, THE AEROPLANE, 166, adilly, W.1.

dworkers Wanted for small aircraft parts. '. London. Controlled establishment. person residing more than 10 miles away ngaged on Government work need apply. ox No. 3616, THE AEROPLANE, 166, Picca-, W.1.

e Assemblers wanted, immediate D.H. rience if possible. Fare paid. Flat rate good shop bonus given. No one on ernment work will be engaged.—Applica-s must be made through your nearest loyment Exchange, mentioning this paper No. 3610.

ughtsmen for aeronautical work required ediately for Midlands, previous knowledge able, but not essential. No one on Govern-t work eligible.—Apply at your nearest loyment Exchange, quoting reference No. 35.

stant Draughtsman required with aircraft rience, immediate. Good wages. Fare to the works, which are in South Wales. one on Government work need apply.—lications must be made through your est Employment Exchange, mentioning paper and No. 3639.

t-class Jig and Tool Draughtsman required t firm in the neighbourhood of Bristol en-ed in aero engine production. Good salary uitable men. No one already employed on ernment work can be engaged.—Apply to est Employment Exchange, mentioning paper and No. 3633.

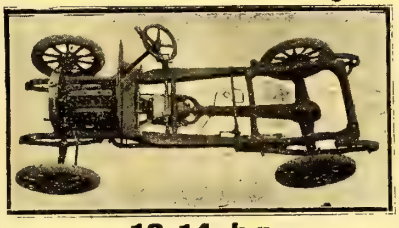
er Erectors and Tinsmiths required for air-t works in N.W. district. No one on ernment work or residing more than 10 s away need apply.—Box No. 3640, THE PLANE, 166, Piccadilly, W.1.

ughtsmen required for aircraft works in V. district. No one on Government work esiding more than 10 miles away need y.—Box No. 3623, THE AEROPLANE, 166, adilly, W.1.

Tinsmiths and Panel Beaters required in Holloway district. Good wages paid to experienced men. No one residing more than 10 miles away or already engaged on Government work need apply.—Box No. 3631, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted at once, Manchester district, Works Manager, for thoroughly up-to-date machine shop on internal combustion engines of highest priority. These works will develop rapidly, and offer excellent prospects for suitable man. State experience fully and salary in last position. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3629.

PALMER'S GARAGE & ENGINEERING WORKS, TOOTING



12-14 h.p.
FIAT CHASSIS FOR NATIONAL SERVICE.
PRICES, with new tyres:—
3-speed model, **£125** 4-speed model, **£150**
IMMEDIATE DELIVERY.
These chassis are the best value obtainable and run 25-30 miles per gallon of petrol.
Write for Catalogue of Fortnightly Auction and for details of my F.I.A.T. Secondhand Cars, Landaulets, Vans, Lorries, 2 and 4 Seaters, etc.
AUCTION SALE EVERY FORTNIGHT.
Entries invited.
Next Sale, THURSDAY, 6 June, at 2 o'clock.
Catalogues sent free on application.
PALMER'S GARAGE, TOOTING.
'Phone: 208 Streatham.
CARS BOUGHT FOR CASH.

First-class Spindle Hands and Foreman Machinist required for Government controlled establishment in London area. Top rate of pay for good men. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3628, THE AEROPLANE, 166, Piccadilly, W.1.

First-class Sheet Metal workers and Foreman required, thoroughly used to aircraft work, for Government controlled establishment in London area. Top rate of pay for good men. No one residing more than 10 miles away or already engaged on Government work need apply.—Box No. 3627, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted Machinist for spindle and planing machines on aircraft work. No one on Government work will be engaged.—State age, experience, and wages required to your nearest Employment Exchange, mentioning this paper and No. 3624.

Experienced Man with engineering knowledge wanted to control and organise progress department of large aircraft works, and to be responsible for distributing work in shops. Must have had similar experience with an up-to-date firm.—Apply, stating age, experience, and salary required, to nearest Board of Trade Employment Exchange, mentioning this paper and No. 3637. No one already on Government work can be engaged.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Works Manager, free to re-engage immediately. Twenty years motor, five years aero engines and planes; British, American, and Continental experience. Guarantees rapid, up-to-date and economic production. No service obligations.—Reply, Box No. 3551, THE AEROPLANE, 166, Piccadilly, W.1.

Foreman, experienced, used to Handley Page main planes, etc., requires similar position or as firm's inspector. Good organiser.—Box No. 3643, THE AEROPLANE, 166, Piccadilly, W.1.

Buyer, with wide continental and British aeronautical and automobile commercial experience, desires appointment with financially sound company. Thorough knowledge of all markets, materials, machines, tools, fabric, etc. Substantial range of sub-contractors at command. Keen and proved organiser. Experience includes both sea and land machines. —State salary and particulars, Box No. 3642, THE AEROPLANE, 166, Piccadilly, W.1.

Assistant Manager of metal fitting department seeks similar appointment; three years in above capacity with a leading firm of aircraft manufacturers. Thoroughly conversant with organisation and modern methods for quick and accurate production.—Box No. 3638, THE AEROPLANE, 166, Piccadilly, W.1.

First-class Woodworking Machinist requires immediate employment. Thorough good spindle hand and cutter maker. Used to aircraft and general accurate work.—Box No. 3636, THE AEROPLANE, 166, Piccadilly, W.1.

Mill Foreman requires situation, thorough practical knowledge of woodworking machinery, economical conversion of timber. Used to large output. Good organiser and tactician. Capable of increasing production.—Please reply to Box No. 3635, THE AEROPLANE, 166, Piccadilly, W.1.

Commercial Man, good organiser, 15 years' secretarial and accountancy experience, disengaged, seeks situation on national work; some knowledge of aircraft routine, A.I.D., and dealings with sub-contractors. Capable of handling heavy correspondence, or costing, progress, etc.—State wages, etc., to Box 3632, THE AEROPLANE, 166, Piccadilly, W.1.

Lady, with good factory experience, desires post as welfare supervisor. Good organiser, capable manager and strict disciplinarian, excellent testimonials.—Box No. 3626, THE AEROPLANE, 166, Piccadilly, W.1.

Foreman, free re-engage immediately. Five years' experience various types; could start new work. Distance no object.—Box No. 3622, THE AEROPLANE, 166, Piccadilly, W.1.

Engineer, with specialised experience in the design of aeroplane engines, wishes to communicate with enterprising engine manufacturer requiring the services of competent and original designer. Advertiser capable of taking charge of design of all types of high-speed petrol motors.—Box No. 3621, THE AEROPLANE, 166, Piccadilly, W.1.

Superintendent of aircraft factory open to receive new appointment. Sound knowledge of timber, woodworking machinery and jigs in all departments for producing maximum output. Most capable organiser and controller of male and female labour. Conversant with all types of machines. Best references.—Box No. 3620, THE AEROPLANE, 166, Piccadilly, W.1.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1.

Wanted one copy of The Aeroplane for Jan. 9th, 1918; also three copies for March 20th, 1918.—G. E. Stechert and Co., 2, Star Yard, Carey Street, W.C.2.

Jig Saw for wood wanted immediate for cash.—Box No. 3634, The Aeroplane, 166, Piccadilly, W.1.

Engineering Works wanted in S.W. district, equipped and running, suitable for aircraft fittings, assemblings, etc.—Send full particulars as to capacity, price, etc., in confidence to "Engineer," Box 433, Sells, Ltd., 168, Fleet Street, E.C.4.

Wanted, half-board and lodging within 5 miles Kingston. Advertiser, a B.Sc., would give tuition aerodynamics, mathematics, and all mechanical engineering subjects in return for slight reduction or gratis to right place.—Box No. 3641, The Aeroplane, 166, Piccadilly, W.1.

TO CONTRACTING FIRMS.

Materials Immediately Required.

Odd Quantities of 3-ply (various thicknesses) fabric, dope, spruce, ash, substitute woods, etc., M.S.P. and aluminium sheet (various gauges), tubing (various diams.), etc., etc. Must be serviceable, but not necessarily to A.I.D. requirements.—Write, giving list for disposal, quotations, and where same may be inspected, to the Cambridge School of Flying and Aerodrome Co., Ltd., 30B, St. Andrew's Street, Cambridge.

WORK WANTED.

Strut Sockets, fitting and assembling; also bench work on aircraft fittings, brazing, case hardening, etc.; also tube bending. Works in S.W. district open to accept further contracts, accurate work, and good deliveries.—"Promptitude," Box 432, Sells, Ltd., 168, Fleet Street, E.C.4.

HAULAGE.

Steam and Petrol Motor Wagons for Hire, for timber transport.—Apply, Silwood Storage Co., Ltd., 7, Victoria Street, Westminster, S.W. Telephone, Victoria 6882.

MISCELLANEOUS.

MAKE MONEY BY WRITING.

£50 PRIZE. Send postage (2d.) for particulars and copy of "How to Earn Money while Learning How to write for Newspapers and Magazines." Practical and Comprehensive Correspondence Courses—Fiction and Articles, etc. Expert Literary Directors. Constructive Criticism. Beginners taught how to make work saleable. Exceptional testimonials. Address "Editorial" (Dept. A), 22, Chancery Lane, London, W.C.2.

FINANCE.

Late Managing Director of well-known Aeroplane Company is desirous of taking a financial and active interest or purchasing outright Aircraft Manufacturing business.—Box No. 3608, The Aeroplane, 166, Piccadilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road. 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page IV.—of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264, or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willowbrook Company, Leicester.

Cane Seats Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

Hexagon Nuts, castellated and plain. We specialise in nuts. Inquiries solicited.—Carleton Manufacturing Co., Ltd., Moseley Road, Birmingham.

FOR SALE.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid.—Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Tarpaulins.—New waterproof khaki sheets for sale. Also second-hand railway truck sheets, repaired and redressed. London works.—For prices, etc., write Johnston, 12, Broughton Road, Croydon.

TO LET.

Convenient Workshop to let in the western district to accommodate 30-35 workers, fitted with electric power and light, also gas. Good benches.—Apply, Box 3625, The Aeroplane, 166, Piccadilly, W.1.

ENGINEERING.

British School of Aeronautics. — Air Engineering Course; Aero Design; Aero struction; Aero Draughtsmanship; Mecha Engineering. — Pennington's, 254, O Road, Manchester.

MODELS.

Model Aeroplane, flies ¼ mile circular fl carriage paid, 3s. 6d. "I can thorou recommend your machines." Testim from Dr. Adams, Union Road, Shef Thousands satisfied, testimonials from parts.—Dept. C., Bristol Model Aero Depôt, Eastville, Bristol.

PUBLICATIONS.

6th Revised and Enlarged Edition with "Types of Aeroplanes" down to

THE AEROPLANE SPEAKS,

By Capt. H. Barber, A.F.Ae.S

Price, 7s. 6d. net.; 8s. post free.

McBride Nast & Co., 2, Breams Build E.C.

BOOKS

By Lieut. Victor W. Page of the U.S. Air Ser

JUST PUBLISHED.

AVIATION ENGINES. Their Design, Con tion, Operation, and Repair. A book for the St Engineer, and all interested in Aviation, by a re ised authority. Giving practical instruction on and maintenance not to be found elsew Medium 8vo. 580 pages, with over 240 ver tinctive and specially made Engravings. Price Net

GLOSSARY OF AVIATION TERMS English-French and French-English. Crow 100 pages, with Plates and Illustrations. Price Ne

AN AVIATION CHART. A large Wall C showing a typical Aeroplane Power Plant in Section, with all important components sh Folding to Pocket Size. Price Net 2s

London: CROSBY LOCKWOOD & S 7 Stationers' Hall Court, E.C.4.

Just published. 360 pp. with Illustrations, 4½ in. 6¾ in., limp cloth. Price 6/- net (postage, 4d.).

The Aviation Pocket Book for 191

By R. BORLASE MATTHEWS, Assoc.M.Inst.C.E., F.Ae.S.

Containing data on Aeroplane Theory and Desi Air Pressure and Resistance, Structural Materi Engines, Typical Aeroplanes, Piloting, Rigg Meteorological Data, Scouting and Signalling, e etc. With Glossary and other information of va to all interested in Aviation.

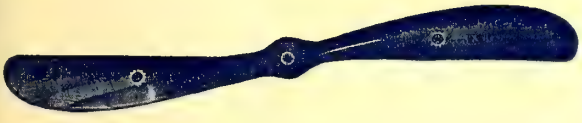
Prospectus on Application.

London: CROSBY LOCKWOOD & [SO 7, Stationers' Hall Court, E.C.



CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

OXY-ACETYLENE
WELDING & CUTTING
PLANT

The Latest and Best Type of Plant for this Process as installe by the leading Aircraft, Shipbuilding and Engineering Firms, H. M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C. ATOZ G.B.

Carbide. Flarelights, Handlamps.
Petrol and Oil Storage Drums of any capacity. Steel Barrels, Sheet Metal Work for Aircraft, etc.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "Flamma, Vic, London." Telephone: Victoria 4830.

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON
CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: 'CAUDROPLAN, CRICKLE, LONDON." Phone: 46 7 4648 HAMPSTEAD.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams: "*Airengine, London*" *Telephones: Gerrara* 8165; *Richmond* 1293.



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passage, London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. Grey

WEDNESDAY. JUNE 5, 1918.

Vol. XIV. No. 23. SIXPENCE WEEKLY

[Registered at the G.P.O. as a Newspaper

John Dawson and Co. (NEWCASTLE-ON-TYNE), Ltd. Air Craft

Newcas le-on-Tyne.
Telephone ... ... CENTRAL NEWCASTLE 2604.
Telegrams ... "DEPENDABLE, NEWCASTLE."

Southampton House,
High Holborn, W.C. 1.
Telephone ... ... HOLBORN 1876.

Auster LONDON. FOR Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE DOPE
The Original — Non-Poisonous
SEE ADVERT. INSIDE.

WAKEFIELD Castrol MOTOR OIL "R" (Racing)
THE ONE OIL for ALL AERO ENGINES.
S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

TELEPHONE: OLDBURY 111. ACCLES & POLLOCK, LIMITED. TELEGRAMS:- ACCLES OLDBURY
WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.
SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.
TRIPLEX SAFETY GLASS
The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aloemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD

Cambridge Street, BIRMINGHAM.



EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren, Piccy, London."
"Phone—280 Gerrard

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.



VARNISHES . . . for AEROPLANES

(SUBJECT TO A.I.D. INSPECTION)

AIRSCREWS, SPARS, STRUTS, STAYS, ETC.

ROBT. INGHAM CLARK & CO. LTD

Offices: Walter House, Bedford St., Strand, W.C.2. and at West Ham Abbey, London,

Telegrams—Pearline, Westrand, London. Telephone—Regent 3923. Telephone—East 955, 956.

Contractors to H.M. Government. On "Lloyd's Register."

Hors Concours Membre du Jury: Brussels International Exhibition, 1910. Grand Prix London, 1908, and Buenos Aires, 1910.

ENGINEERING EMPLOYERS' FEDERATION 1896

Telegrams JONAS. SHEFFIELD.

REGISTERED I C N TRADE MARKS.

Telephone No. 4660. PRIVATE BRANCH EXCHANGE.

S.B.A.C. SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

SIR JOSEPH JONAS, COLVER & Co., LTD

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. A SPECIAL NICKEL CHROME GEAR STEEL.
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. A NICKEL CHROME STEEL IN FOUR GRADES.
Eminently suitable and strongly recommended for Gears. Crankshafts and other highly stressed parts, ar having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properti with silent running.

G.P.S. A HIGH GRADE ALLOY CASE HARDENING STEEL
For severely strained parts, such as Gear Wheels, Gudgeon Pins etc.

SHEFFIELD.

SIDDELEY – DEASY

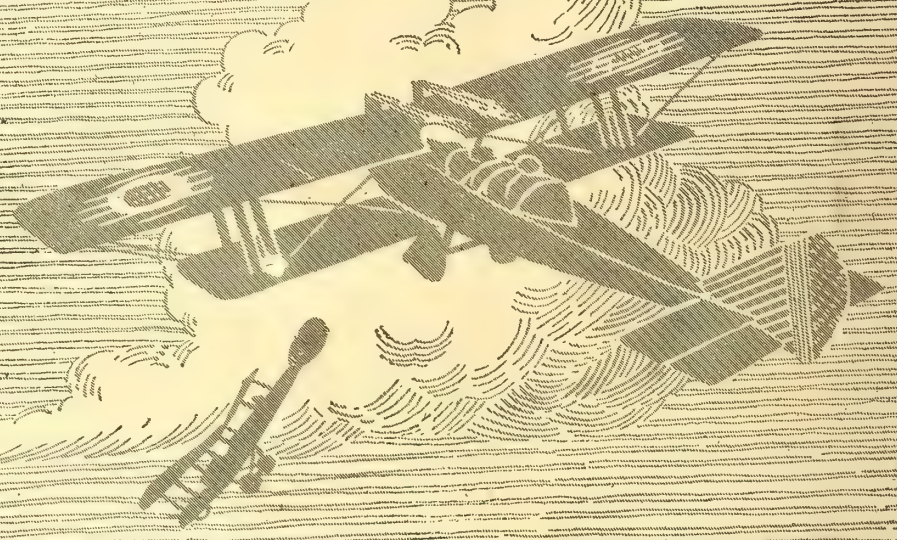


Contractors to H.M. Air Ministry: Designers & Manufacturers of Aero Engines & Aeroplanes; & of Luxurious Motor Carriages

THE SIDDELEY–DEASY
MOTOR CAR CO., LTD.
COVENTRY



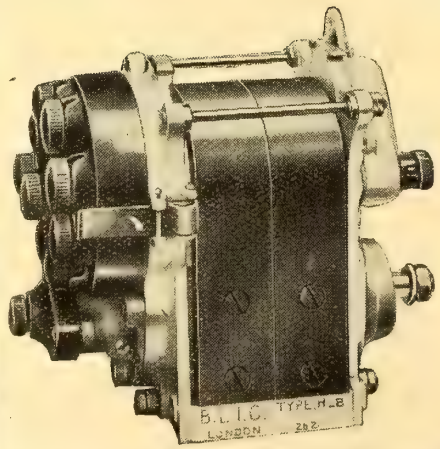
Godbolds



THE HEART OF THE AEROPLANE—the vital centre of its power unit—is undoubtedly the magneto. Failure there must be unthinkable! That is why the "B.L.I.C." Magneto is supreme—its absolute reliability may be taken for granted!

B·L·I·C

THE BRITISH LIGHTING & IGNITION Co Ltd



THE BRIIISH LIGHTING AND IGNITION Co., Ld

204, Tottenham Court Road, London, W.1.
Proprietors: VICKERS Ld.

CONTRACTORS TO THE
ADMIRALTY & WAR OFFICE

C. G. Spencer & Sons
LIMITED.

THE
KITE BALLOON AND
PARACHUTE EXPERTS

AERONAUTICAL APPARATUS
OF EVERY DESCRIPTION.

ROPES, FABRICS AND EQUIPMENT.

THE PIONEER FIRM.
FIRST IN 1835. FOREMOST TO-DAY.

At HIGHBURY, HACKNEY, BRIXTON, CLAPTON
Head Office: 56a HIGHBURY GROVE, LONDON, N.
'PHONE: DALSTON 1893. TELEGRAMS: "AERONAUT, LONDON."


WHITEHEAD
AIRCRAFT
RICHMON
SURRI

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.

Allen's Steels

For Motor Cars - -
For Aeroplanes - -

Valve Steels.

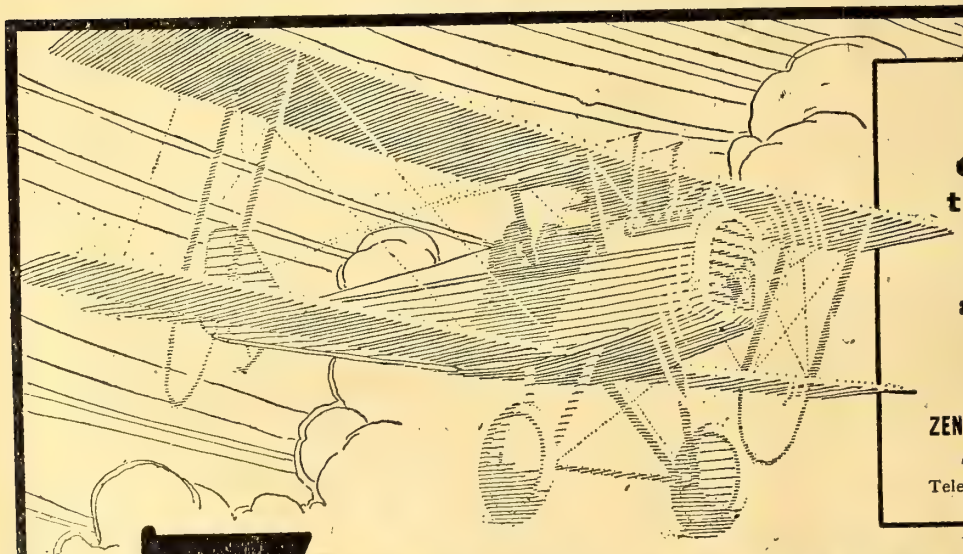
FOR AERO engines, Allen's Tungsten Valve Steel (T.V.S.) is highly recommended.

Also Allen's Special Chrome Valve Steel, which is an alloy designed to resist shock and corrosion.

Write for Catalogue D.

(Aeroplane and Motor Steels).
Post Free.

Edgar Allen & Co. Ltd
Sheffield.



The All-British Carburetter that ensures Speed, Climbing, and Staying Powers.

Send for Booklet—

ZENITH CARBURETTER CO., LTD.
40-42, NEWMAN ST., W.1.
Telephone — Regent 4812 4813.

ZENITH
CARBURETTERS

WITTON

Fuselages
Chassis
Tails
Cowling.

AIRCRAFT

Airscrews
or
Complete
Machines.

Offices:
13, Goodwin Street,
Fonthill Road,
Finsbury Park, N.

Phone: North 2110.

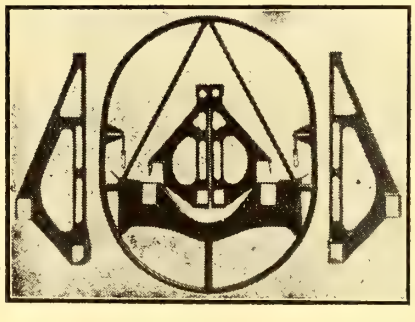
WITTON, WITTON & CO.
Partners { Charles William Wells.
William John Wells.

MAKERS OF THE "WITTON" PIANO.

Sopwith Engine Plates in Stock, Complete Sets.
Speciality Copper Pipe Work.

WRITE FOR PRICES.
THEY ARE RIGHT.





ALL PARTS PASSED A.I.D. AT OUR WORKS.

SWIFT Aviation Ltd.

Contractors to H.M. Government.

'PHONE—
762 KINGSTON.

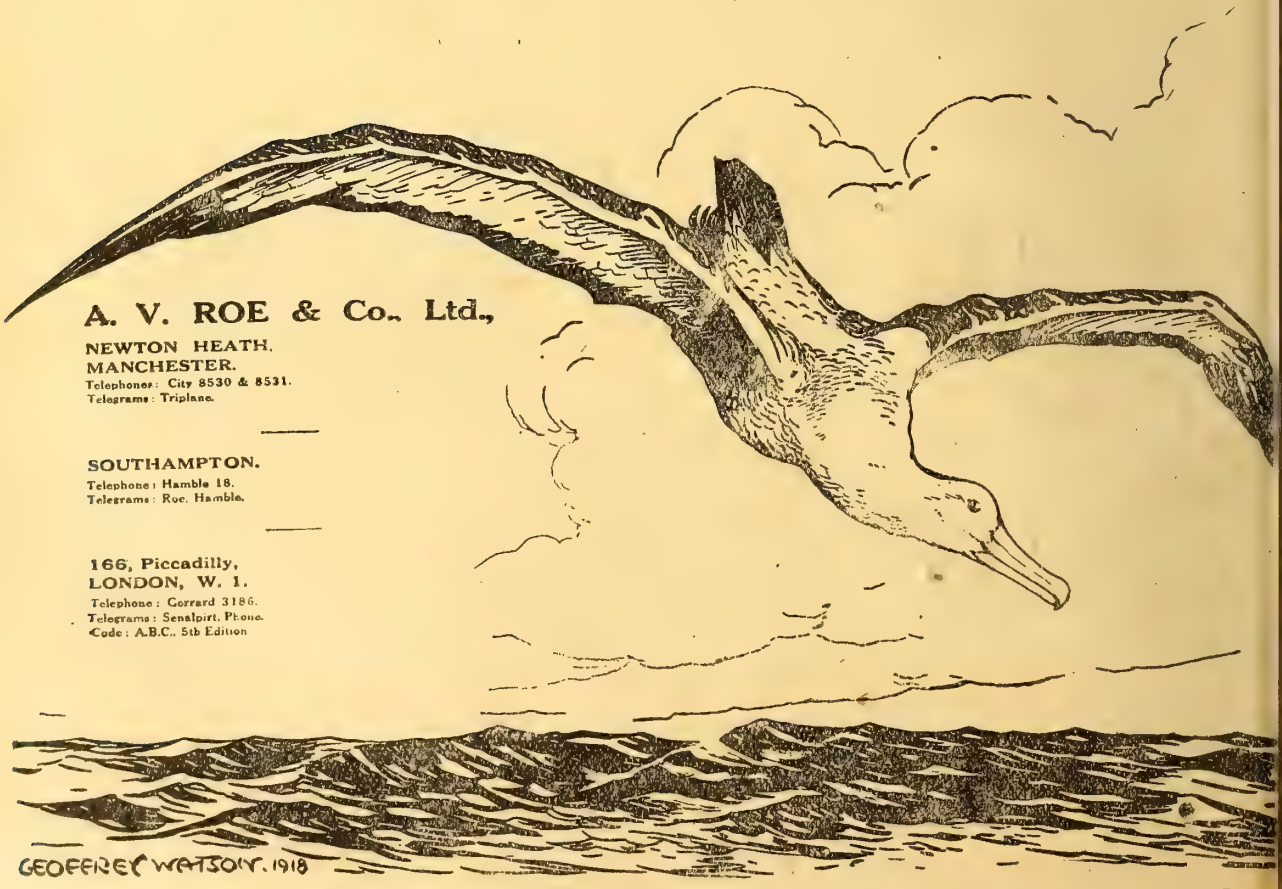
KINGSTON

'GRAMS—
"SWIFT, KINGSTON."



AVRO

AEROPLANES
AND
PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH.
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Sensalpirt, Phone.
Code: A.B.C., 5th Edition

JUNE 5, 1918 VOL. XIV. NO. 23

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of
The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, Year, $8.
U.S.A., 1 Year, $8.50c.

ON WINNING THE WAR.

One is fairly safe in assuming that the vast majority people in this country honestly want to win this war, id want to win it soon. The minority who do not e the international financiers, largely German Jews, ho find all the belligerent countries being more and ore heavily mortgaged to them as the war goes on, id the Bolsheviks posing as Trade Unionists who erely desire universal anarchy in the hopes of acquir- g loot for themselves.

There is perhaps a third section, also a minority, who int to win the war, but not too soon. They are the ir profiteers, employers and workmen alike, who would gard an early return to the pre-war standard of profits, fore they have pouched their wealth, as a greater igedy than the deaths of the men who are dying at e rate of an unestimated number per minute on active vice.

Of the three sections, the last are the people who are ost likely to see their wishes gratified, though they ay possibly see their profits and savings vanish entirely fore the war is won, for it is gradually becoming dent to the meanest intelligence that this is going to a very long war.

We might have won the war this year had it not been for e treachery of Russia. But we have only ourselves to me for the blow we have suffered through this cause, d we may well regard it as a just punishment for er having formed an unnatural alliance with the Slav e, which all our real statesmen in the past, and until matter of twelve years or so ago, regarded as our atest enemy.

Happily the natural alliance with America—that least mocratic of all nations—will in time restore the ance of strength in men and material. But it is well consider the possible course of events before con- tulating ourselves on the certainty that America's p will enable us to win the war.

Our Growing Strength.

merica has done wonders in sending men and food Europe. It was stated recently that there are already a lion American troops in France. They should be trained, ipped, and in the fighting line before the end of this r. Already many thousands of them have proved ir high quality as fighting men. In direct opposition the Englishman's idea of the American, obtained efly from the get-rich-quick Yankee drummer *glicé*, commercial traveller), the war American is a et, clever, and earnest young man, fully cognisant is own ignorance and very anxious to learn all about . With the aid of the American troops the Hun will successfully held and ultimately defeated in France. t the same time our own increasing efficiency in culture and the production of war material, together h the growing strength of our anti-submarine forces, our greater output of shipping, will remove all fear of our breaking down owing to lack of food or munitions of war. The same argument applies to France and probably to Italy.

No conceivable death-rate in the field could equal the number of young men who come into the Armies of the Allies automatically on reaching military age each year, so that there seems no possible prospect of a break- down owing to shortage of men. Therefore the Anglo- Franco-American-Latin alliance can apparently keep the war going for ever, if necessary.

The Enemy's Increase.

Germany may or may not be as short of food as we are led to believe. Stories published in German papers by prisoners or internees returned from England read exactly like the opposite versions published in this country from people who have returned from Germany. And it is said by people who have to do with German prisoners that their parcels from home contain "delica- tessen" and more solid provender on a scale which is as incompatible with the alleged starvation of Germany as are the parcels which go from this country to British prisoners in Germany with the food situation in England as depicted in German papers.

Moreover, Germany is now master of the most fertile food-producing areas of what were Russia and Roumania. When the German wants anything, being wise, he takes it, whoever else has to go without it. So, if there is corn in Russia, failing the ability to find corn in Egypt, thanks to our Army in the Near East, the Hun will have it. Thus he will counter our blockade, by way of balancing up our ultimate defeat of his submarine cam- paign. So neither belligerent alliance will succeed in starving the other.

In the matter of man-power the German is also situ- ated much as we are. Even if his vassal States, Austria and Turkey, fail to find the necessary men, owing to the need for looking after their own troubles, the Ger- man can always conscribe Russians. The ignorance of the Russian peasant is so abysmal, his mentality so entirely animal, and his amenity to discipline so great, that when once impressed by the idea that he has found his master he would probably fight as loyally for Ger- many as for Russia, and being properly organised, armed, and fed, he would certainly make a better soldier of the Kaiser than he did of the Czar. So probably the addition of Russian troops—to be carefully distinguished from the independent Cossack, Caucasian, and Turco- man tribes, who will doubtless remain independant— will balance up on the German side the addition of the Americans on ours. Therefore there seems no particular reason why Germany also should not carry on the war for ever.

Doubtless this would suit admirably the game of the German-Jew International Financiers, who would be making a profit out of both sides. That is unless the

populations of the various belligerent nations became really annoyed with the whole Jewish race and started a pogrom in the approved Russian fashion. Which would probably begin in this country from some really important cause, such as a row over a season ticket to Brighton, or confusion in a costermonger's mind over the difference between spreading Bolshevism or botulism from a Jew butcher's shop in Mile End. Such are the vital root-causes which alter the face of History, and cause her to wear so much artificial complexion.

The Quickest Way Out.

The world has had the Hundred Years War, and the Thirty Years War, and various other lengthy wars, but one assumes that we of the present generation have no particular desire to go down in history as the originators of the Eternal War. Therefore the sensible way out seems to be the organisation of some sound scheme for stopping the war.

We might have gone a long way towards doing so if we had started in 1915 by turning on a few really capable engineers to produce land-battleships instead of allowing a gang of monumentally incapable bunglers to waste time and labour and money in turning out the clockwork sardine-tins which they called "tanks." We lost that chance in a manner which can only be fully described when D.O.R.A. ceases her all-embracing autocracy.

Now we have another chance if we are sufficiently awake to seize it. To-day, if we do not hold the absolute command of the air, we have, at any rate, the upper hand of the Hun to such an extent that we may honestly claim the mastery in the air, although so distinguished an officer as General Henderson and so undistinguished a person as Major Baird agree in disagreeing with Sir Douglas Haig as to the possibility of such mastery existing. It seems, therefore, as if the development of aerial warfare to its fullest extent may just turn the balance of the war in general to such an extent as to enable the Western Allies to put an end to the war in the manner which they desire. Which means a complete victory.

Fanatics and Unbelievers.

One has never been among those enthusiasts—generally recent converts who have become fanatics in accord with historic precedent—who prate about winning the war in the air. None the less, it may be well to restate the axiom that the only thing which wins a war is an army of occupation standing on its own flat feet in enemy territory. The most that aircraft, or the Royal Air Force, can do is to make it a trifle easier for the Poor Blessed Infantry to reach enemy territory and stop there.

But, if that necessary aid can be given, it is everybody's job to help, and one way in which even those who are not directly concerned can help is by preaching the gospel of sane enthusiasm. Those who are over-enthusiastic are as dangerous as those who still disbelieve in the power of aircraft. And the disbelievers are even to-day more numerous than one might think.

An Ill-Timed Attack.

For instance, early last month Mr. Holt Thomas, one of the most knowledgeable as well as one of the most successful pioneers of aviation in this country, delivered a short address to an organisation called the American Luncheon Club. He was reported—possibly with the degree of accuracy or the reverse habitual to the Fleet Street reporter—as having said that "the German Offensive could have been frustrated had we possessed sufficient fighting aircraft." Forthwith the statement is seized by a not particularly knowledgeable writer in "The Field" and pilloried under the somewhat offensi heading, "The Folly of Exaggeration," on the groun that "It is a matter for regret that people of ackno ledged position and authority in the aeroplane moveme should express opinions so wide of the mark."

"The Field" is an excellent paper, so firmly esta lished and so satisfied with its own position that its su title is "The Country Gentleman's Newspaper." O grants its right to the title without question, and j because, by the grace of God, the country gentlem is still a greater force in the nation than either the G man Jew or the Bolshevik, it is the more to be regrett that so estimable a paper should not provide its influential readers with better education in aeronauti affairs.

Apparently what Mr. Holt Thomas did say was t if we had had sufficient aircraft the German offens could not have taken place. Which seems a fairly s evident proposition, for if we had had enough fighti machines to clear the Hun out of the air, and had a had a sufficiency of bombing machines, various thi could have been done to make the advance impossi And those things can still be done in the future frustrate future enemy attacks.

Things Which Can Be Done.

Knowing something of what we have up our slee in the way of aeroplanes and engines, if only our br storm merchants in the Technical, Production, Equipment departments will allow them to be used reasonable time instead of playing with them as t own particular toys for a year or so, one has no hes tion in saying that the Hun can be absolutely beate the air long before the end of this year. And when Hun air-fighters are beaten, then we can turn the at tion of the Royal Air Force properly and for the time to his people on the ground.

As Mr. Holt Thomas himself pointed out, in a l to "The Field," if we had sufficient bombing mach we "could guarantee that a railway was permane out of action, that it would be impossible for con or troops to traverse roads, that the preparatio bringing up guns and providing dumps of ammuni etc., would be impossible."

Over and above this, the enemy gunners coul blinded, both by the complete abolition of his arti observation machines and by continual bombing o gun positions. All aerial reconnaissance and p graphy would be impossible for him. Therefore whole of the preliminary ground work on which attacks are based would, of necessity, be non-exis So much, at least, could be done to hold up and we the enemy attacks, without ever going outside the b area, or departing from what is coming to be know "Tactical Bombing."

Strategic Bombing.

As that authoritative writer Mr. Henry Forester pointed out, Sir Edward Hamley has defined Str as affecting the Theatre of War, and Tactics as con ing the Field of Battle. In these days of guns w 75-mile range, the field of battle is somewhat exte and the theatre of war may be taken as including square mile of enemy territory, with all that in Therefore, tactical bombing covers everything w what the French call "the Zone of the Armies," if effectively carried out will come near to paral the action of enemy troops within that zone.

Strategic bombing then covers everything else, it is here that the Royal Air Force has its great o tunity of winning the war by attack from the ai sufficient bombing machines are available, if the

lequately organised and directed, if the machines are the best, if the personnel is fully trained in dropping mbs with precision—and not merely in pulling the igger and hoping for the best—it is possible to put the hole of Germany's immense production centres along ie Rhine out of action and keep them out of action.

Cutting off all supplies from every source within 200 iles of the Eastern French Frontier is purely a matter arithmetic in production and common sense in administration. Never has there been a simpler proposition war, and never has a nation had a finer opportunity success than we have to-day. If we fail in this, then e thoroughly deserve to be beaten, for it will be *prima cie* evidence that it is time for England to be conquered id to be reorganised by some race with greater ability.

It is hard to believe that the German Armies could main in France if once its supplies from the Rhineland ere cut off. And the moral effect of a withdrawal from rance to a defensive line along the Rhine should be ough to cause revolution even among so well-sciplined a people as the Germans. Such are the ssibilities of strategic bombing, and it will be criminal we miss this opportunity.

The Corpus Christi Affair.

Nothing could be better proof of our superiority in e air than the affair of the Corpus Christi processions Cologne. And incidentally nothing could demonrate better the folly of democracy and the benefits of istocracy. Strings of letters have appeared during the ıst week in the "Daily Mail"—which, if one may dge by these letters, seems to have become the recogsed organ of the cad-in-the-street—raving against the reign Office for acceding to the request of the Archshop of Cologne that his city should not be bombed that Holy Day. It never seems to have occurred to e writers that the request was a confession of weakss and that the granting of it was evidence to the rld of our strength. The incident merely proves to erybody that we can attack aerially when and where e will, just as the German Army can do, apparently, the ground.

Despite the fact that Austria represents the remnants the Holy Roman Empire, that Prussia's subject State, varia, is entirely Roman Catholic, and that the Rhinend and Alsace are largely Roman Catholic, yet the ipal interests could not prevent the shelling of Paris on Good Friday and Corpus Christi day by the Lutheran Prussian—king of iconoclasts.

Yet, when British gentlemen—who, curious though it may seem, appear still to have some influence in minor matters with a Cabinet which includes Messrs. George and Law—are asked to refrain from being unpleasant on a Holy Day, they give their word to refrain, and keep it.

The "Daily Mail's" friend, the cad-in-the-street, cannot, naturally, understand the calm superiority which is inherent in such action. Still less can he estimate the value of such action among our Roman Catholic Allies in France, Italy, and Portugal, among Roman Catholic neutrals such as Spain and the South American Republics, and among Roman Catholic enemies such as the Austrians, Bavarians, and Irish. Probably our Ministry of Information will quite miss the opportunity the incident affords for useful propagandist work in Roman Catholic countries, especially in Ireland, but, even so, we have the satisfaction of knowing that, bad as is our Government, there are a few gentlemen somewhere in communication with it.

The Responsibility of the Bolo.

However, there you have the proof, from the enemy, of our superiority. The Royal Air Force can attack when and where it wills. The effects of its attacks depend entirely on the people in the Air Ministry.

The Air Minister himself is all out to win the war, and one is under the impression that he believes that it can be won in the air. It can be won in the air provided that he has no mercy on inefficient subordinates. The way to win the war in the air is to deliver in the shortest possible time the greatest possible number of the best possible engines and aeroplanes, to man them with efficient pilots, and to train adequate mechanics to keep them in order.

We have aeroplanes and engines which are better than any in the world. It is for Sir William Weir's subordinates to see that they are produced. If they fail in their task through internal intrigue, through personal disagreements, or through seeking after their own interests, they are traitors to their King, their country, and their comrades in the Royal Air Force, and they deserve to be shot as the traitor Bolo, from whom their office earned its nickname, was shot. If they fail through incapacity, then the kindest thing to do with them is to accord them the honour of going to the front and being shot by the Hun.—C. G. G.

THE NEW DECORATIONS.

The Air Ministry deserves to be congratulated on the creation the two new decorations, the Distinguished Flying Cross d the Air Force Cross. Some such decoration was obviously cessary to correspond with the D.S.C. of the Navy and the .C. of the Army.

Where, however, the Air Ministry has shown particular wisdom in differentiating between gallantry in the face of the enemy, d bravery or good service while flying at home. This fference at once abolishes the anomaly of people wearing a oss inscribed "For Valour" when in fact they have never en over or under fire.

Some difficulty may be found in deciding what precisely is, is not, "in the face of the enemy." A seaflying novice on s first patrol trip may sink a defenceless submarine—defence-ss, of course, only in the sense that he may have the luck to tch it when almost submerged—but it seems certain that he ould be entitled to the D.F.C., although the top of the enemy's ad would be nearer to him than the face of the enemy. On e other hand a veteran sea-patrol pilot might fly for months, ight do most distinguished service, and might display the eatest pertinacity and gallantry in serving his King and in ving his passengers under difficult circumstances. Yet he ight never have the luck to meet an enemy face upwards or any other position. The question therefore arises as to ether distinguished flying of this kind is technically conlered as flying in the face of enemy.

Somewhat similar questions arise as to ferry pilots, who fly lly armed from England to France and all over France, delivering machines from place to place. Their flying is certainly active service flying, as differentiated from the still more arduous and dangerous work of testing new and untried types of machines or making dangerous, and sometimes foolish, experiments under the orders of senior officers—one can mention two very valuable officers who were killed recently in such ways. Such points appear to complicate somewhat the question of who is entitled to the D.F.C. and who to the A.F.C.

Incidentally A.F.C. also stands for Australian Flying Corps, and as the Australian Squadrons are part of the Australian Imperial Force (A.I.F.) it seems doubtful whether they can be absorbed into the R.A.F. except by special Act of Parliament in the Australian Legislature. And as Australia is mighty proud of her Flying Corps—with very good reason—one doubts whether the A.F.C. will be cheerfully surrendered to the R.A.F.

If the A.F.C. is not R.A.F., then the A.F.C. ought to have the M.C., but not the D.F.C. or A.F.C. Strictly speaking, while Capt. William Smith, A.F.C., R.A.F., may quite well exist, Capt. William Smith, A.F.C., A.F.C., should not, which is, perhaps, as well, for it would appear a trifle confusing.

However, the idea of instituting two quite separate decorations for those whom the late Manfred von Richthofen used to differentiate as "trench-hogs" and "base-hogs" is essentially sound, and doubtless each cross will be as gallantly won by the R.A.F. as the D.S.C. and M.C. have been won by the R.N.A.S. and R.F.C. in the past. And, meantime, the D.S.O. still remains as the hall-mark for good service to the King either as a fighting man or as a valuable officer in other war activities.—C.G.G.

NIGHT RECONNAISSANCE.

Lt.-Col. Repington, writing in the "Morning Post" on May 30th of the "surprise" attack on the Soissons-Reims sector, says:—

We seem to have known too little of the German concentrations on the eve of March 21st and May 27th. Admitting that the movements were carried out by night in their last stages, it remains true that some 10 to 20 divisions occupy long road spaces and that better means must be sought to discover these movements and the preliminary concentration of guns. Trench raids are no longer enough, and some process of scouting the main roads by night must be discovered and systematised by the Air Forces of the Allies unless we wish to witness a repetition of these more or less surprise attacks, which cost us heavily in men and war material, lose us valuable ground, and encourage the enemy.

[Coming from a journalist these remarks might be taken as casting a slur on the efficiency of the Royal Air Force, but coming from a soldier of Colonel Repington's standing they merely contain a suggestion as to the direction in which further development is necessary.

Hitherto night reconnaissance has not been considered a necessity. It now appears to be so. And the problem does not seem to present any very great difficulties. Much may be done with scientifically designed searchlights carried on aeroplanes. One has heard of wonderful results with quite small instruments which have been produced both in France and England. Also the common or firework-display parachute flare is no novelty. Night-flying is now almost a national industry, so there is no difficulty on that score.

It is purely a matter of organising special squadrons for night reconnaissance, as squadrons are organised for night-bombing, and keeping them for that work. Obviously no man could fly all night and all day as well, so the night reconnaissance people would have to be specialists in their own line of business. When once the need for such work is recognised, as doubtless it has been by now, the difficulties may be considered as having been overcome. And fortunately we have the shortest nights of the year before us in which to organise for the longer nights when such work will be more necessary.—C.G.G.]

A GOOD CAUSE.

The R.F.C. Aid Committee has now changed its name to the R.A.F. Aid Committee and Prisoners of War Fund. One is happy to be able to record that Lady Henderson has consented to be President and Honorary Treasurer of the R.A.F. Fund as she was of the R.F.C. Fund, the Committee remaining practically the same with the addition of Lady Paine as representing the Naval side of the Royal Air Force. Miss Dudley is Secretary of the Fund and Mrs. W. M. Pryor is Hon. Secretary for the Prisoners of War. The offices of the Fund are at Surrey House, Marble Arch, London, W.1., and contributions should be sent there.

With the inception of the R.A.F., combining as it does both the R.N.A.S. and the R.F.C., and the increasing size of both Services, the drain upon the resources of the Fund is naturally enormously increased. All possible assistance is therefore necessary if the Fund is to continue to help those who are unfortunate enough to be made prisoners of war, and if it is to alleviate somewhat the lot of those on Active Service.

Those who are interested in the Fund's work are invited to call at Surrey House any day between 11 and 1 o'clock and learn for themselves in detail the various branches of the work done by the Fund. In the meantime one appeals for the practical sympathy and co-operation of all interested and asks on behalf of the Fund that donations may be made as soon as possible.

LONDON DEFENCES.

Maj.-Gen. E. B. Ashmore, Commanding the Aerial Defences of London, on June 1st unveiled, at Lord Mayor Treloar's Cripples Hospital and College at Alton, Hants, a tablet recording the establishment of a cot dedicated as a memorial to the children killed in a London borough on the enemy air raid of June 13th, 1917.

In unveiling the tablet, Gen. Ashmore said the children had died innocently, and their deaths had done no particle of good to the German cause. The effect of the raids from the point of view of military gain had always been small, and it tended to become smaller. At first the raids produced a certain feeling of dismay; but after nearly a year's bombing London was far better able to bear up under the inflictions. In the case of the night raids there at first appeared to be no answer. But necessity brought hard thinking, and always more and more was an effective answer found.

"The last raid showed a great advance in our methods," added Gen. Ashmore. "Of some 30 odd machines that attempted the attack we totally destroyed seven. We shall—I am sure of it—do even better than that. We are experimenting and improving every day. Scientific—one might say, ultra-scientific—discoveries are employed. Training and material are being improved, and the night skill of our brave pilots is increasing. I cannot promise that odd machines will not break through, but I confidently expect that we shall make raids on London too expensive for the Huns to continue."

"The people of London," he said, "were stout-hearted. Some aliens, not so stout-hearted, had migrated to other places. He did not think the other places liked them, but London certainly did not object to their absence.

There had been retaliation for the raids both on German towns and on the Germans who took part in the raids. The memorial cot would remind them of the children's sacrifice. It should steel their hearts and stimulate them to the highest effort against the enemy, so that the sacrifices would not have been in vain.

AN IMPORTANT FUNCTION.

The 1918 Wilbur Wright Memorial Lecture will be delivered in the Central Hall, Westminster, on Tuesday, June 25th at 8 p.m. by Dr. W. F. Durand, Chairman of the American Advisory Committee for Aeronautics, and Scientific Attaché to the American Aviation Mission in Europe. His subject will be "Some Outstanding Problems in Aeronautics."

The finances for the Wilbur Wright Lecture are derived from the proceeds of an endowment fund raised in memory of the late Mr. Wilbur Wright, the founder of modern flying, and the premium this year has been awarded by the Aeronautical Society of Great Britain, which administers the fund, to Dr W. F. Durand.

The entry of the United States of America into the War could not be more suitably celebrated than by recognising the great services of the late Mr. Wilbur Wright to aeronautics, and the selection of Dr. Durand, not only on account of his many qualifications, but also on account of the great nation to which he belongs, is a singularly happy one.

Last year's Wilbur Wright Lecture was delivered by Lt.-Col. Mervyn O'Gorman, C.B., shortly after America officially declared war, and by a happy chance Major Dodds, chief aviation staff officer to General Pershing, was able to take the chair, is therefore the more fitting that the lecture itself should this year be delivered by an American citizen, and one who is obviously of French descent.

It is likely that there will be a great many applications for tickets, and those desiring them should apply at the earliest possible opportunity to the Secretary of the Aeronautical Society of Great Britain, 7, Albemarle Street, Piccadilly, W.1.

CONGRATULATIONS.

PAGE—THYNNE.—On May 18th, at St. George's, Hanover Square, W.1., Mr. F. Handley Page was married, very quietly, to Miss Una Helen Thynne.

Mr. Handley Page is, of course, well known to all readers of this paper as one of the pioneers of aviation in this country. He is perhaps better known to the world at large as the designer and producer of the most successful multiple-engine aeroplane yet produced.

Mr. Page's successes as an engineer, as a designer, and as a business man are truly remarkable, and are the more remarkable when one considers his comparative youth. One has no hesitation in prophesying for him very great further successes to come, and in wishing him such successes one is glad that one can now associate with his name that of his bride.

* * *

ROE.—On June 1st, at High Firs, Bursledon, Hants, to Mr. and Mrs. A. V. Roe, a son.

NEWS OF AN OLD FRIEND.

His many friends in this country will be interested to hear that M. Pierre Verrier, who has now become a prominent manufacturer of aeroplanes in Paris, recently married Mademoiselle de Marcay, sister of the Baron de Marcay, who is M. Verrier's partner in the aeroplane business.

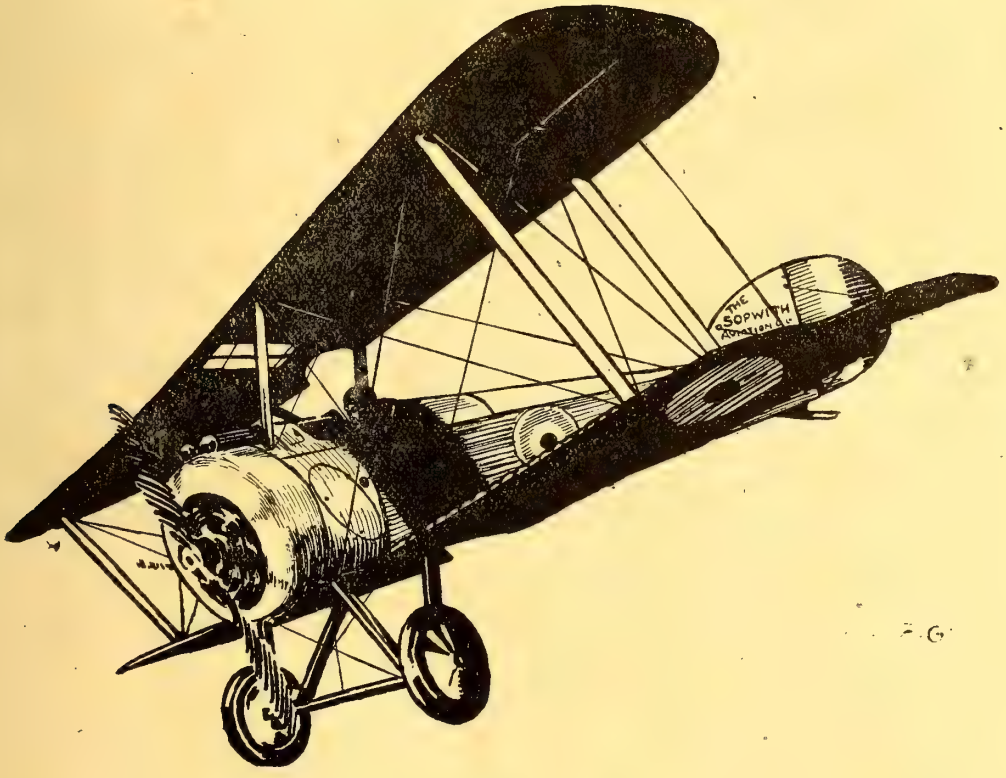
M. Verrier was always one of the most popular pilots at Hendon, and all who knew him will wish him and his bride every good fortune and happiness.

Although the de Marçay-Verrier firm has only been in existence for a comparatively short time, the output is already very considerable, and as it has reached pretty well the limit for the existing factory in Paris, the firm have opened a branch factory in the South of France, where it is hoped that still greater output will be produced.

AIRCRAFT WORKERS' SPORTS.

The third annual aircraft workers sports will be held on Saturday, June 22nd, at Stamford Bridge, under the auspices of the Y.M.C.A. Approximately, 36 firms are taking part in the sports this year, so the events should be more than a little exciting. Last year the Sports Committee was able to hand over a cheque for £200 for the Fund for Disabled Soldiers' and Sailors' Hostels and Trade Colonies, and, as on that occasion there were only about 20 firms taking part in the sports, the takings all round should be bigger this year, and, therefore, the Sports Committee hopes to have very considerable sums to hand over to charities. Admission to the sports may be obtained by payment at the gate at Stamford Bridge.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

Paris Office:
21, RUE DU MONT THABOR.

KINDLY MENTION "THE AEROPLANE," WHEN CORRESPONDING WITH ADVERTISERS.



NAVAL & MILITARY AERONAUTICS



GEOFFREY WATSON

FROM THE "LONDON GAZETTE."

War Office, May 28th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—The follg. appts. are made :—

Flight Comdr.—Lt. F. Workman, M.C., R. Ir. Rif., Spec. Res., from a Flying Officer, and to be temp. Capt. while so empld., Nov. 26th, 1917.

Equipt. Officers, 1st Cl.—Lt. R. J. Bennett, Spec. Res., from the 2nd Cl., and to be temp. Capt. while so empld., Feb. 7th.

War Office, May 28th.

The following is from a continuation of Sir D. Haig's dispatch of April 7th, submitting names deserving of special mention :—

Australian Flying Corps.—Bailleau, Maj. C. L. ; Blake, Maj. D. V. J. ; Watt, Maj. W. O.

Air Ministry, May 28th.

R.A.F.—The follg. temp. Appts. are made at the Air Ministry :—

Staff Officers, 2nd Cl.—And to temp. Majs. while so empld. if not already holding that rank :—Capt. (temp. Maj.) C. A. J. Butter, Sec. Lt. A. R. Fulton, April 1st.

Staff Officer 3rd Cl.—Lt. (temp. Capt.) H. O'N. de Segrave, and to retain his temp. rank, vice Lt. (temp. Capt.) S. T. Ravenscroft, May 15th.

The follg. temp. appts. are made :—Staff Officers, 2nd Cl.—Maj. A. R. Martin, April 24th ; Capt. (temp. Maj.) C. R. Andrews, May 13th ; Lt. (temp. Maj.) H. P. Maybury, and to retain his temp. rank while so empld., May 19th.

Staff Officer, 3rd Cl.—Lt. H. J. G. Newman, and to be temp. Capt. while so empld., May 3rd ; R. B. Longridge (Lt., 16th Lrs., Spec. Res.), and is granted a temp. commn. as Lt. and to be temp. Capt. while so empld., May 10th.

Flying Branch.—Lts. to be temp. Majs. while empld. as Majs. (Flying) :—(Temp. Capt.) L. H. Peter, M.C., April 30th ; (Temp. Capt.) I. C. Little, May 17th.

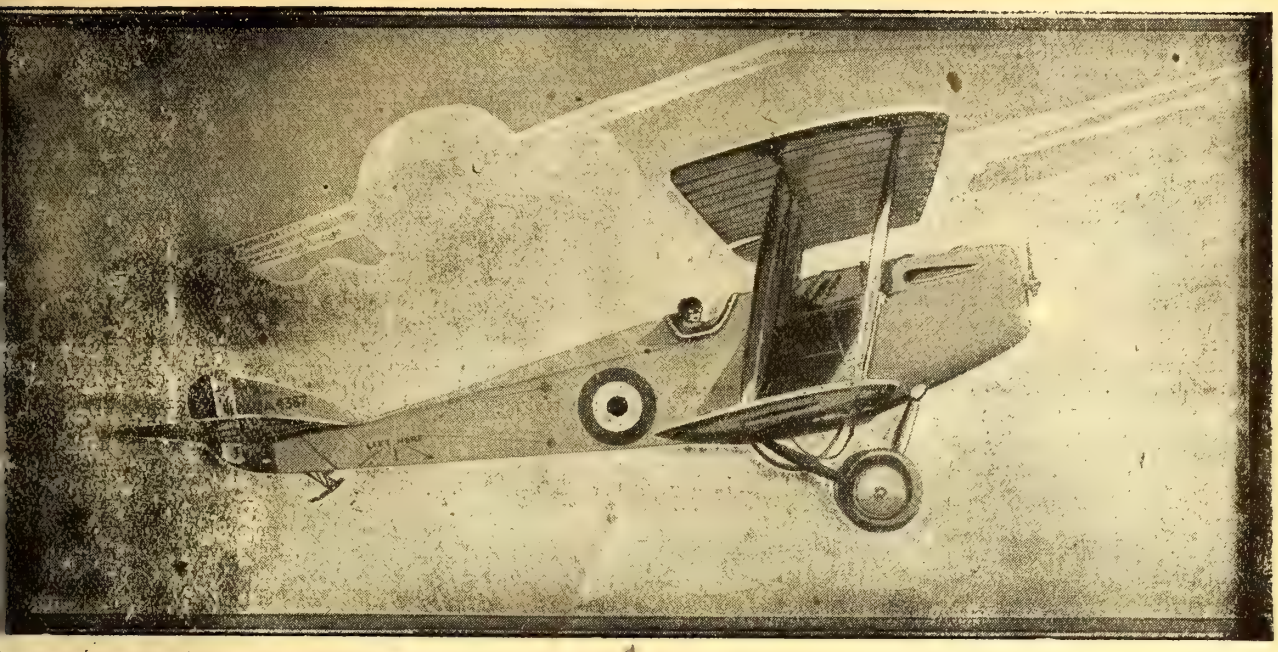
Lts. to be temp. Capts. while empld. as Capts. (Flying) :—F. A. Ayrton, April 1st ; M. L. Doyle, April 24th ; A. B. Fairclough, May 4th ; M. G. Baskerville, May 7th ; H. G. W. Debenham, May 8th ; J. M. Mason, D.S.C., May 9th ; F. H. Davies, May 12th ; (Hon. Capt.) G. K. Cooper, N. L. Gartin, May 14th ; (Hon. Capt.) E. Pierce, May 15th ; T. Durrant, May 16th ; (Hon Capt.) H. V. Drew, May 17th ; H. Dear, to be Sec. Lt. (from Sec. Lt., Tech., April 8th.

Sec. Lts. (on prob.) to be Sec. Lts. (A. and S.) :—A. D. Hegan, H. Russell, C. T. Skipper, J. Stephens, J. C. Deremo, April 1st ; H. Woodcock, T. McScott, A. Kendall, April 2nd ; G. Swannell, C. J. Sanders, D. G. Paterson, F. E. Welford, J. S. Wilson, F. L. Hill, H. L. Tamplin, F. T. Heron, April 3rd ; J. D. Ford, T. H. Robinson, April 4th ; D. P. Pogson, A. W. R. Evans, L. C. Story, April 5th ; G. L. Rutherford, W. E. Angell, April 6th ; R. H. O. Tubbs, W. Oram, J. F. S. Percival, R. A. Arnott, H. C. Turner, A. G. M. Strowger, C. H. Flinn, April 7th ; E. C. Hill-Clarke, L. W. D. Peacock, J. C. Langford, A. W. Clark, H. L. Barradell, T. H. Forrest, W. N. L. Cope, C. Greaves, H. W. Heslop, W. J. Knoll, H. B. Harmsworth, H. K. Goode, T. Conlan, R. C. Creamer, W. Ginger, Geoffrey Hall, R. C. Knowles, A. O. P. Heron, V. G. H. Phillips, H. T. Taylor, A. V. Trimble, C. H. Dickens, L. H. Stiles, W. Stephenson, April 8th ; H. Warburton, F. Ollenbittle, J. R. King, A. E. Moir, A. R. Strachan, J. Webster, C. A. C. Fullerton, J. M. Wilson, F. M. Ruggles, April 9th ; A. M. Stahl, April 10th ; H. S. Sandiford, April 11th ; F. Abrahams, S. C. Gilbert, W. J. Bedworth, J. Howard, W. L. Murray, W. J. Salmons, H. S. Basford, W. H. Jordan, T. H. Rogers, H. H. Ross, J. W. Gibson, C. H. Sawyer, F. Shaw, R. G. Bradbury, F. C. Butler, E. O. Humphries, S. McG. Brown, F. B. Stark, April 12th ; C. H. S. Pain, P. Chauncy, April 13th ; J. R. Watkins, April 14th ; P. A. Cox, A. L. L. Carroll, April 15th ; F. H. A. Weale, April 20th ; D. B. Sinclair, April 21st ; I. L. R. Large, A. W. Buchan, A. W. M. Bryant, April 22nd ; J. P. Cross, R. N. Gosling, H. E. Minton, A. McL. Mooney, A. E. Gardiner, D. H. Prosser, April 23rd ; H. W. Matthews ; F. Clayton, F. J. Whitelaw, R. P. Whyte, H. M. C. Drummond-Wolff, P. R. Moore, B. Green, L. Smith, April 24th ; A. W. Sawyer, J. T. D. Margrave, J. A. Matthews, J. A. C. Randall, G. V. L. Taylor, C. A. McIntosh, E. F. Adams, J. R. A. Farfan, G. Ballance, M. P. Fraser, S. Engel, E. H. Lyon-Hall, C. Waine, I. C. Slater, G. Richardson, G. H. Glasspoole, B. H. Stretton, D. F. Grant, H. [illegible] Thomas, April 25th ; W. Parke, H. C. Dakin, A. E. Brown, S. J. Davies, T. J. Lethbridge, F. P. Whittaker, B. Critchley, G. A. Franklin, J. C. Paterson, T. Robson, H. Hill, J. B. Spence, A. E. Connolly, P. Bertrand, H. Vost, W. J Cairns, J. N. Gatcliff, A. Rogerson, L. P. Vigurs, H. D. Teetzel, R. M. Hillman, B. Fisher, R. C. Hirst, R. A. Pearce, April 26th ; L. Lovatt, A. L. Stanfield, F. Barker, T. H. W. Pearce, V. U. T. Watson, N. Weatherley, J. F. Robb, L. B. Raymond, W. T. Martin, T. Hazen, J. H. Carthew, E. J. Lainchbury, B. C. McDougall, J. K. Graham, W. S. Campbell, April 27th ; A. Shepherd, K. Yeomans, C. N. C. Dickson, R. K. Douglas, A. K. Whitema April 27th ; J. J. Borrowman, S. J. Manser, J. J. B. Rutter, J. Waddington, April 28th ; R. C. Rogers, J. B. Isaacs, J. Spence Hall, C. Houlgrave, J. A. McGill, M. L. Green, April 29th ; L. Court, F. L. Shield, E. L. Milborrow, April 30th.

The follg. are granted temp. commns. as Sec. Lts. (A. and S —W. B. Clarke, M.C. (Sec. Lt., R.G.A.), H. Laycock (ten Sec. Lt., attd. E. Lan. R.), April 1st ; E. M. C. Shipp (Lt. R. Fus., T.F.), and to be Hon. Lt., April 3rd ; H. W. Taylor, M. (Lt., R.F.A., Spec. Res.), and to Hon. Lt., April 4th ; A. Clark, M.C. (Lt., attd. R. Hdr., Spec. Res.), and to Hon L H. B. Wood (Sec. Lt., R.F.A.), April 5th ; H. Buie (temp. S Lt., attd. S. Lan. R.), H. A. Young (Sec. Lt., R.F.A., Sp Res). April 7th ; J. R. Stacey (Lt. W. Ont. R., C.E.F.), and be Hon. Lt., B. B. Sinclair, (Lt., R.F.A., Spec. Res.), and be Hon. Lt., G. A. Gowler (Sec. Lt., attd. R. Berks R.), A 8th ; R. L. Tilley (Lt., R.W. Surr. R.), and to be Hon. Lt., A 9th ; J. E. J. Barstow (Lt., N. Som. Yeo., T.F.), and to be H Lt., J. A. Ditton (Lt., Quebec R., C.E.F.), and to be H Lt., S. Fleming (Lt., R. Sc. Fus., T.F.), and to be Hon. April 12th ; E. R. C. Hobson (temp. Capt., Br. W.I.R.), and be Hon. Capt., April 13th ; J. E. Parke (temp. Sec. Lt., attd. Fus.), G. L. Pilkington (Capt., Lanc. Hrs. Yeo., T.F.), to be Hon. Capt., W. J. Dalziel (Lt., Sask. R., C.E.F.), to be Hon. Lt., April 22nd ; W. J. McMahon (Lt., C. Ont. C.E.F.), and to be Hon. Lt., E. N. Copping (Lt., Sask. C.E.F.), and to be Hon. Lt., April 23rd ; R. E. Shields (Lt., Ont. R., C.E.F.), and to be Hon. Lt., R. O. Campney (Lt., Ont. R., C.E.F.), and to be Hon. Lt., C. C. Hirst (Lt., L R., T.F.), and to be Hon. Lt., J. E. Palmer, D.C.M. (Lt., M.G.C.), and to be Hon. Lt., April 24th ; J. McFarlane, (temp. Capt. attd. R. Fus.), and to be Hon. Capt., L. E. mott (Lt., C. Ont. R., C.E.F.), and to be Hon. Lt., J. Whit (Lt., Manitoba R., C.E.F.), and to be Hon. Lt., R. W. Ashw Sec. Lt., Hamps. R., T.F.), A. J. Hunter (Sec. Lt., Middx. S.W. Orr (Lt., C. Ont. R., C.E.F.), and to be Hon. April 25th ; J. H. Don (Capt., N.Z. Dental Corps), and t Hon. Capt., A. G. Inglis (Capt., A.S.C., T.F.), and to be Capt., Hon. R. W. Morgan-Grenville (Capt., Rif. Brig., Res.), and to be Hon. Capt., J. C. F. Wilkinson, M.C. Lond. R., T.F.), and to be Hon. Lt., L. G. Spinney (temp. A.S.C.), and to be Hon. Lt., April 26th ; B. F. L. Yeoman Lt., Lond. R., T.F.), G. Wilby (temp. Sec. Lt., attd. S. S R.), April 27th ; A. Barrington (temp. Sec. Lt., attd. E. S R.), April 29th ; J. H. Blount (Sec. Lt., Oxf. and Bucks L April 30th.

The follg. Cadets are granted temp. commns. as Sec. (Kite Balloon) :—T. D. Brotherstone, J. W. Brown, H. V. S. Gaskill, C. R. Jones, P. Lavery, F. E. A. MacDonnell Moulding, V. Williams, G. W. N. Simpson, May 13th ; H. A Barker, A. R. Bloxham, B. R. Burns, C. H. Edwards, L Dodge, U. P. Perring, G. H Pittam, L. L. Veryard, May 2

The follg. Cadets are granted temp. commns. as Sec. (Obsr. Officers) :—M. G. Ashby, J. R. Brown, J. M. Ca A. Dix, R. Goldman, E. L. Goulder, W. E. Grainger, W. Ha H. A. Hamlet, W. D. Hartland, A. Harvel, E. C. Heyes, R Kennedy, C. T. Marshall, H. Mason, A. C. Pring, L. F. F W. Sharples, H. P. Turnbull, W. B. Warneford, C. H. W April 27th.



The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds the World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE

Head Office

WOKING, Surrey.

H. C. Dumbell (Lt., R.F.A., T.F.) relinquishes his commn. on account of ill-health contracted on active service, May 29th.

Administrative Branch.—C. H. Frazier, M.C. (Qrmr. and Hon. Capt., Manch. R.), is granted a temp. commn. as Capt., March 11th.

P. P. C. Penberthy is granted a temp. commn. as Capt., May 4th.

Sec. Lt. E. Clark resigns his commn. to resume his medical studies, and is granted the hon. rank of Sec. Lt., May 29th.

Sec. Lts. resign their commns. :—F. B. Elkins, C. D. Potter, J. M. Schollick, G. G. Stephenson, May 29th.

Sec. Lt. G. F. Atkinson relinquishes his commn., May 29th.

W. M. P. Cutler (Sec. Lt., M.G.C.) relinquishes his commn. on account of ill-health, May 29th.

A. J. B. Trower (temp. Sec. Lt., attd. R.W Surr. R.) relinquishes his commn. on account of ill-health contracted on active service, May 29th.

Technical Branch.—To be temp. Capts. while empld. as Capts. (Tech.) :—Lt. (Hon. Capt.) K. R. Paterson, May 7th; Lt. (Hon. Capt.) G. Fresheville, May 15th.

Sec. Lts. to be temp. Lts. while empld. as Lts. (Tech.) :—S. H. Child, J. M. Pinkerton, A. W. O'Q. Shire, May 10th; P. R. Garner, May 11th; (Hon. Lt.) G. Baillie, D. Sinclair, May 13th; V. C. Legg, May 14th.

Lt. B. D. Bellamy to be Lt. (Tech.), from Staff Officer, 4th Cl., April 25th (substituted for notification in the "Gazette" of May 3rd).

Sec. Lts. (Administrative) to be Sec. Lts. (Tech.) :—J. A. Rennie, H. G. Short, R. D. Thompson, May 4th; T. Williams, J. L. Malkin, A. V. Jay, P. H. F. George, L. E. Pool, S. Bishop, May 6th; F. J. Horman-Fisher, May 20th; A. R. Deacon, C. J. Skidmore-Jones, May 29th.

The following are granted temp. commns. as Sec. Lts. (Tech.) :—E. R. Parsons (Lt., R.G.A., T.F.), and to be Hon. Lt., April 29th; W. Gregory (temp. Sec. Lt., attd. Hamps. R.), J. E. Sierra (temp. Lt., R.F.A.), and to be Hon. Lt., D. Wright (Sec. Lt., R.D.C., T.F.), E. H. Walker, M.C. (temp. Lt., R.F.A.), and to be Hon. Lt., C. E. Wilkin (temp. Lt., R. Fus.), and to be Hon. Lt., H. W. Wolverton (temp. Lt., Gen. List), and to be Hon. Lt., May 4th; H. H. Weller (temp. Sec. Lt., Labour Corps), P. Eadie (Lt., R.E., T.F.), and to be Hon. Lt., D. R. J. O'Connor (Lt., R. W. Surr. R., T.F.), and to be Hon. Lt., C. Keith-Murray (temp. Lt., A.S.C.), and to be Hon. Lt., W. F. Peatfield (temp. Lt., R.G.A.), and to be Hon. Lt., May 6th.

The initials of L. H. Secombe are as now described, and not as in the "Gazette" of May 7th.

Capt. G. St. B. S. Watkins relinquishes his commn. on account of ill-health, and is granted the hon. rank of Capt., May 29th.

Medical Branch.—H. C. T. Langdon (temp. Maj., R.A.M.C.) is granted a temp. commn. as Maj., and to be temp. Lt.-Col. while empld. as Lt.-Col. (Med.), May 1st.

A. H. Cheatle is granted a temp. commn. as Maj., and to be temp. Hon. Lt.-Col. while holding present appt. as temp. Hon. Lt.-Col. (Med.), May 15th.

F. F. Muecke (temp. Maj., R.A.M.C.) is granted a temp. commn. as Maj., and to be temp. Lt.-Col. while empld. as Lt.-Col. (Med.), May 2nd.

R. P. Williams (temp. Capt., R.A.M.C.) is granted a temp. commn. as Capt., and to be temp. Lt.-Col. while empld. as Lt.-Col. (Med.), May 2nd.

H. Pritchard (temp. Hon. Maj., R.A.M.C.) is granted a temp. commn. as Hon. Maj., May 2nd.

M. W. Flack (temp. Hon. Maj., R.A.M.C.) is granted a temp. commn. as Hon. Maj., and to be temp. Hon. Lt.-Col. while empld. as temp. Hon. Lt.-Col. (Med.), May 2nd.

The follg. are granted temp. commns. as Capts. and to be temp. Majs. whilst empld. as Majs. (Med.) :—A. P. Bowdler (temp. Capt., R.A.M.C.), J. McIntyre (temp. Capt., R.A.M.C.), May 1st.

Lt. G. G. Fairbairn to be an Administrative Officer from Observer and to be temp. Capt. while so empld., April 1st.

Memoranda.—Lt. (Hon. Capt.) (Capt., R.A.), R.O. Skinner relinquishes his commn. on ceasing to be empld., May 7th.

Lt. (Hon. Capt.) (Capt., I.A.) W. H. L. O'Neill relinquishes his commn. on ceasing to be empld., May 16th.

War Office, May 29th.

REGULAR FORCES—Establishments.—Schools of Instrn.—Schools of Mil. Aeronautics.—Asst. Instr.—(Graded as Equipt. Officer, 2nd Cl.)—Temp. Lt. E. V. Pemberton, Gen. List, a Flying Officer (Obsr.), Jan. 1st.

War Office, May 30th.

REGULAR FORCES—Establishments—Schools of Instrn.—Schools of Aerial Gunnery.—Chief Instr.—Graded as a Sqdn. Comdr.—Lt. (temp. Capt.) R. G. Heyn, Spec. Res., from an Instr. (graded as a Flt. Comdr.), and to be temp. Maj. while so empld., March 4th.

* * *

The following names are mentioned for distinguished and gallant services and devotion to duty with British Forces in Italy in a dispatch which has been received by the Secretary of State for War from General Sir Herbert C. O. Plumer, G.C.B., G.C.M.G., G.C.V.O., A.D.C. :—

Royal Air Force.

Ambrose, Lt. H. E. (late Gen. List); Barker, Lt. (temp. Capt.) W. G., D.S.O., M.C. (late Gen. List); Blackmore, Lt. (temp. Capt.) A. E. (late S.R.); Blount, Capt. (temp Maj.) C. H. B., M.C. (late R.W. Surr. R.); Breen, Lt. (temp. Capt.) J. J. (late R. Ir. R.); Cockburn, Sec. Lt. A. L. (late R.R.); Disney, Capt. H. A. P. (late Cambs R.); Frew, Lt. (temp. Capt.) M.B., D.S.O., M.C. (late Gen. List); Godfrey, Lt. (temp. Capt.) S. C., M.C. (late R.S. Fus.); Hadley, Lt. H. (late Gen. List); Higgins, Lt. and Hon. Capt. J. W. (late R.F.A.); Joubert de la Ferte, Lt.-Col. P. B., D.S.O. (late R.A.); Macnab, Capt. C. S. (late Cam. Highrs.); Mills, Maj. (temp. Lt.-Col.) R. P., M.C. (late R. Fus.); Mills, temp. Sec. Lt. S. E. (late Gen. List); Lambert, Lt. C. (late S.R.); Vaucour, Capt. (temp. Maj.) A. M., M.C. (late R.A.); Webb-Bowen, Lt.Col. (temp. Brig.-Gen.) T. I., C.M.G. (late Bedf. R.).

Allen, 15737 1st A.M. A. J.; Baker, 10298 1st A.M. (A./Cpl.) A. W.; Barnes, 17188 1st A.M. E. C.; Beauchamp, 18953 Flt.-Serjt. H. E.; Bentley, 11149 1st A.M. J.; Clark, 8023 Serjt. R.; Creek, 5748 Flt.-Serjt. J.; Edmond, 12228 Flt.-Serjt. J.; Goodwin, 27374 1st A.M. A. W.; Hampson, 32751 Corpl. J.; Lambert, 8487 1st A.M. E. H.; Nicholson, 9097 1st A.M. D. E. O.; Nicholson, 12492 Corpl. G.; Payne, 2006 Flt.-Serjt. W. H.; Turner, 128 T./S.M. W. G.

War Office, May 31st.

The King has been pleased to approve the following awards for gallant services rendered on the occasion of an hostile air raid :—

The Distinguished Service Order.

Lt. (Temp. Capt.) C. J. Q. Brand, M.C., R.A.F.

For conspicuous gallantry. While on patrol at night he encountered an enemy aeroplane at a height of 8,700ft. He at once attacked the enemy, firing two bursts of 20 rounds each, which put the enemy's right engine out of action. Closing to a range of 25 yards he fired a further three bursts of 25 rounds each, and as a result the enemy machine caught fire and fell in flames to the ground. Captain Brand showed great courage and skill in manœuvring his machine during the encounter, and when the enemy aeroplane burst into flame he was so close that the flames enveloped his machine, scorching his face. This officer has shown great determination and perseverance during the past nine months when on anti-aeroplane patrols at night, and his example of unassuming gallantry and skill has raised his squadron to a very high state of efficiency.

The Military Cross.

Temp. Lt. A. J. Arkell, R.A.F., Gen. List.

For conspicuous gallantry when, during a hostile aeroplane raid, he and his observer, Pte. Stagg, while on patrol, sighted a Gotha machine at a height of 10,000ft. He opened fire at a range of 200 yards, and so manœuvred his machine as to give his observer, despite a vigorous fire being continually poured on to his machine from the enemy aeroplane, a target which offered the best possible advantage for attack. Pte. Stagg then opened a heavy fire upon the enemy aeroplane at close range, as a result of which the enemy machine burst into flames and crashed to the ground. Lt. Arkell showed the utmost coolness and courage during the engagement, the result of which was to cause the enemy machine to be brought down.

The Military Medal.

No. 10652 1st Cl. Pte. A. T. C. Stagg, R.A.F. (Romsey).

While acting as Gunner-Observer to Lt. Arkell on aeroplane patrol during a night hostile aeroplane raid, Pte. Stagg showed great courage and skill in that during the engagement with an enemy aeroplane at a height of 10,000ft., and although under a heavy machine-gun fire from the enemy, he was able to take advantage of the skilful manœuvring of the machine by Lt. Arkell which enabled him to open a heavy fire on the enemy. As a result of this fire the enemy machine burst into flames and crashed to the ground entirely out of control.

Air Ministry, May 31st.

R.A.F.—The following temp. appt. is made at the Air Ministry :—Staff Officer, 2nd Cl.—Capt. (temp. Maj.) H. A. Oxenham, M.C., May 21st.

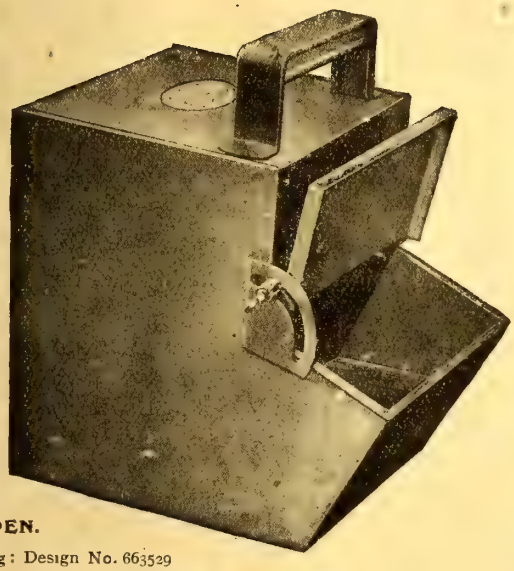
Flying Branch.—Maj. C. H. Butler, D.S.O., D.S.C., to be temp. Lt.-Col. while empld. as Lt.-Col. (Flying) (A. and S.), May 8th, seny. April 17th. (Substituted for notification in "Gazette" May 21st.)

Maj. C. H. Stringer to be temp. Lt.-Col. while empld. as Lt.-Col. (Flying) (K.B.), May 21st.

Lt. (temp. Capt.) G. M. Thomas to be temp. Maj. while empld. as Maj. (Flying) (Dir.), May 20th.

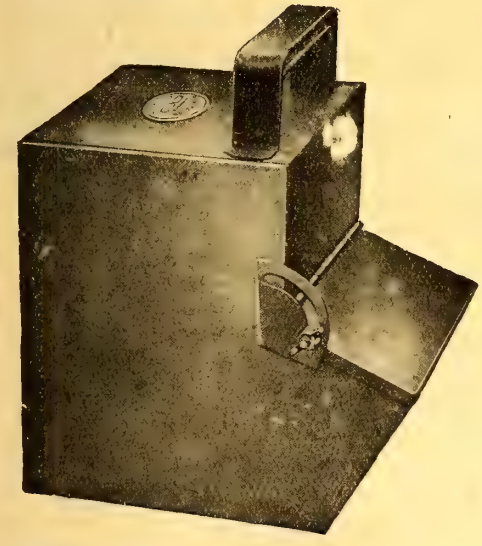
Lts. to be temp. Capts. while empld. as Capts. (Flying) :—S. Anderson (A. and S.), May 10th; J. R. Milne (A. and S.), May 11th; H. O. N. de H. Segrave (A. and S.), April 18; J. S. Chick (A. and S.), G. Fox-Rule (A. and S.), F. J. Ransley (A. and S.), S. T. Ravenscroft (from S.O.), May 15th; (Hon. Capt.) J. A. Glen, D.S.C., May 16th; W. E. Staton (A. and S.), May 18th; (Hon. Capt.) D. Don (Dir.), (Hon. Capt.) R. Scott Sugden (Dir.), May 20th; J. H. Forman (A. and S.), May 21st.

BLACKBURN BAP AIRCRAFT PRODUCTS



OPEN.

Reg: Design No. 663529



CLOSED.

The "ECONOMY" DOPE CAN

ADOPTED BY THE AIR BOARD.

OWING to the great shortage and waste of Dope, we have created a special Dope Can of the Chicken Feed Type, as illustrated.

The bulk of the Dope is kept airtight in the can, thus avoiding the evaporation of the Solvents and thickening of material. The brush is fed with just the necessary quantity as it is required by the operator.

When the job is finished, there is no need to transfer the Dope back into the drum, and it will be found in perfect condition for use when required.

Specify the BAP and secure the maximum of efficiency with the minimum of Dope consumption.

For Prices and full particulars, communicate direct with the PROPRIETORS:—

BLACKBURN AIRCRAFT PRODUCTS,
30, Norfolk Street, London, W.C. 2.

Blackburn AIRCRAFT

Steele's Ad. Serv.

Lt. (Hon. Capt.) (temp. Capt.) C. G. Durham relinquishes the temp. rank of Capt. on resuming duty as Lt. (Flying), May 9th.

Temp. Sec. Lts. (on prob.) to be temp. Sec. Lts. (Flying), A. and S. :—C. F. Kirby, April 6th; L. T. Caithness, April 20th; E. N. Allott, April 21st; H. Hitchen, W. Lee, April 22nd; S. Jones, April 24th; S. M. Connolly, W. L. Dougar, April 25th; H. Watson, D. Brabury, R. N. Essell, April 26th; S. T. Crowe, J. R. Brown, W. G. Lance, F. D. Smith, J. Pryce-Jones, W. A. Stead, April 27th; D. C. Mangan, L. McL. Lord, April 28th; V. G. Hinds, K. R. Angus, April 29th; H Marsden, C. E. Trippe, J. H. Mainwaring, N. A. Weir, K. L. Birtwistle, C. W. Hewson, H. R. Frank, R. J. Wood, April 30th; E. P. O'Connor-Glyn, L. W. C. Pearce, W. J. Hale, J. A. Archibald, E. W. Langford, R. J. Searle, W. J. Miller, H. W. Leyland, L. Skeldon, J. Duncanson, E. G. L. Weaver, J. Douglas, May 1st; J. E. Phillips, A. H. Wood, A. N. Hyde, N. Mason, C. W. Arning, C. A. B. Caukwell, F. A. Brock, T. H. A. Vivers, R. Esworth-Heater, V. N. Dickinson, C. N. Barker, W. A. Wilson, E. W. Cockroft, L. V. Dennis, R. T. Ingram, A. B. Campbell, A. S. Sinclair, K. R. Campbell, H. P. Brumell, J. W. Frechette, A. E. N. Ashford, J. G. Renshaw, J. R. Belton, R. I. Jenkinson, E. H Coote, G. A. Hadley, R. Miller-Tait, S. H. F. Jones, J. H. H. Brunt, May 2nd; P. S. Tennant, C. C. L. Baldwin, C. Cutler, J. V. Dallin, S. F. Wilkin, D. Rodger, J. T. Duckworth, W. L. Field, May 3rd; R. D. Rogers, H. L. Cross, W. B. Blatherwick, C. R. Boyd, C. R. Tolley, J. Appleby, F. W. Douglas, H. Parsons, May 4th; J. B. Dunn, E. H. Attwood, May 5th; F. R. Cooke, W. D. Straight, S. J. Hill, E. L. W. J. Finch, J. Atkinson, A. Vickers, A. C. Weeks, D. H. Sadler, May 6th; M. Thornton, G. F. Williams, E. I. Dallinger, J. W. Birkenshaw, C. J. Willcox, C. Brown, May 7th.

The following are granted temp. commns. as Sec. Lts. (Flying), A. and S.:—H. D. Arnott, E F. Coyle, C. A. Dixon, I. W. Dunbar, F. M. Dunlop, E. I. English, B. C. Fairchild, R. Foley, F. R. Frizelle, A. D. Geiger, D. C. Girardot J. H. Glen, F. McE. Gorman, C. St. C. Guild, J. W. Hammond, F. Harris, W. B. Henderson, C. J. H. Holms, M. G. Horkins, R. C Hunter, R. G. H. Hurton, W. A. Isaac, J F. Jones, W. C. Kinnisten, J. G. G. Layton, J. A. Longley, C. A. McConville, J. G. McGregor, F. L. McGuire, R. J. Mackay-Cantell, S. Markusson, W. A. Marshall, D. B. Menzies, C. M. K. Morrison, R. S. Murray, L. C. Page, J. B. B. Paterson, A. G. Power, F. E. Power, J. E. Price, H. W. Press, W. M. Ritchie, J. F. Roscoe, D. Rose, S. L. Rose, L. W. Sage, W. Schaefer, J. L. Sherwin, J. Skinner, H. MacD. Starke, H. L. Stevenson, R. F. St. Oegger, F. H. Sullivan, W. J. Tansey, L. P. Waits, C. F. Watchorn, N. S. Watt, J. B. Wood, R. S. Wood, O. H. Bertrand, S. J. Beveridge, R. D. Bradley, R. S. S. Chaffe, R. J. Cotterell, April 6th.

A. S. Poynton (temp. Lt.) (Technical) to be temp. Sec. Lt. (Flying), A. and S., and to be Hon. Lt., May 2nd.

The following are granted temp. commns. as Sec. Lts. (Flying), A. and S. :—H. E. Fenwick (temp. Sec. Lt., Northd. Fus.), April 20th; J. F. Lewis (temp. Lt., Manch. R.), and to be Hon. Lt., April 22nd; J. H. L. Farfan (temp. Lt., A.S.C.), and to be Hon. Lt.; A. C. S. Buist, M.C. (temp. Lt., Gordon Highrs.), and to be Hon. Lt., April 26th; J. E. T. Sutcliffe (Lt., S. Staff. R., T.F.), and to be Hon. Lt., April 28th; C. C. Coats (Lt., R. Scots, T.F.), and to be Hon. Lt., April 30th; W. K. McGlashan (Sec. Lt., Gen. List, New Armies); D. M. John (temp. Sec. Lt., attd. Devon R.), May 1st; D. A. McDonald (Lt., Quebec R., C.E.F.), and to be Hon. Lt.; J. O. Claxton (temp. Sec. Lt., Liverpool R.); C. R. McMullin (temp. Sec. Lt., Yorks L.I.); R. E. Baty, M.C. (temp. Sec. Lt., Northd. Fus.); L. N. Robinson (Lt., R.N.V.R.), and to be Hon. Capt.; H. V. R. Roberts-Taylor (Sec. Lt., Kent Cyclist Bn., T.F.); A. K. Boning (Lt., Norf. R., T.F.), and to be Hon. Lt.; H. W. Hollands (temp. Lt., attd. Shrops L.I.), and to be Hon. Lt., May 2nd; C. V. A. Bucknall (Sec. Lt., Dns.), May 3rd; G. W. E. Hanmer (Lt., Shrops Yeo., T.F.), and to be Hon. Lt.; S. M. Feurer (temp. Sec. Lt., attd. R. Berks R.), May 5th; C. C. Woodall (temp. Sec. Lt., attd. Worc. R.), May 6th.

W. A. Gurr is granted a temp. commn. as Sec. Lt. (K.B.D.), April 10th.

The rank of Lt. (Hon. Maj.) L. G. S. Reynolds is as now described, and not as stated in the "Gazette" of May 14th.

Lt. J. A. Warner relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lt., April 2nd.

Lt. W. R. A. Campbell relinquishes his commn. on account of ill-health, and is granted the hon. rank of Lt., June 1st.

Administrative Branch.—Lt. (temp. Capt.) C. H. Biddulph-Pinchard to be temp. Maj. while empld. as Admin. Maj., April 20th.

The following are granted temp. commns. as Lts. while empld. as Admin. Lts. :—J. Runciman (Qrmr. and Hon. Lt., Ches. R., T.F.), April 17th; R. W. E. Lord Grimthorpe (Capt., Yorks Hrs., T.F.), and to be Hon. Capt., May 16th; P. Dalton (temp. Lt., R.E.), May 17th.

H. T. Weston is granted a temp. commn. as Sec. Lt., and to be temp. Lt. while empld. as Admin. Lt., May 22nd.

The following are granted temp commns. as Sec. Lts. :—G. A. H. Wootton, May 1st; S. G. Ball, May 10th; J. E. G. Henchman, E. Hodgson, A. P. Manners, A. J. Thompson, K. G. Ward, May 24th.

Capt. G. E. Stringer resigns his commn., and is granted the hon. rank of Capt., June 1st.

Sec. Lt. J. O'Rorke relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Sec. Lt., June 1st.

Lt. E. S. Campbell relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lt., June 1st.

Sec. Lts. resign their commns. to resume their medical studies, and are granted the hon. rank of Sec. Lts. :—A. G. Dobrashian, W. H. Scott, June 1st.

Sec. Lts. resign their commns. :—W. Cordner, A. H. Hicks, June 1st.

The notification in the "Gazette" of April 23rd, regarding Lt. (Hon. Capt.) H. C. Waghorn, is now cancelled.

The initials of P. G. Addie are as now described, and not as stated in the "Gazette" of May 21st.

The surname of Sec. Lt. F. Davison is as now described, and not as stated in the "Gazette" of May 21st.

Technical Branch.—Capt. (temp. Maj.) H. R. Vagg to be temp. Lt.-Col. whilst empld. as Lt.-Col. (Tech.), April 28th.

Lt. (temp. Capt.) J. H. Dunn to be temp. Maj. whilst empld. as Maj. (Tech.), May 15th.

Maj. J. Hills to be Maj. (Tech.), from S.O., May 21st.

Lt. L. P. Timmins to be temp. Capt. whilst empld. as Capt. (Tech.), May 20th.

Sec. Lts. to be temp. Lts. whilst empld. as Lts. (Tech.) :—R. R. Richards, May 20th; E. F. Cameron, W. G. Horton, May 21st.

T. Stevenson (Temp. Sec. Lt., Gen. List) to be temp. Lt. whilst empld. as Lt. (Tech.), May 20th.

Temp. Sec. Lts., on prob., R.F.C., Gen. List, to be temp. Sec. Lts. (Tech.) :—A. Scott, May 15th; H. M. Drabble May 16th.

The following are granted temp. commns. as Sec. Lts. :—H. G. Reddy (Sec. Lt., Lond. R., T.F.), April 1st; J. K. M. Dodds (Lt., R.F.A., T.F.), and to be Hon. Lt., May 6th; T. J Boyer (Sec. Lt., S. Gds., Spec. Res.), May 15th.

Sec. Lt. (Hon. Lt.) J. J. Lynch relinquishes his commn. on account of ill-health contracted on active service, and retains the hon. rank of Lt., May 7th.

Sec. Lt. F. B. Sellar relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Sec. Lt., June 1st.

Medical Branch.—The following are granted temp. commns. as Lts. :—G. M. Mellor, May 15th; L. E. Stamm, May 24th.

The following are granted temp. commns. as Lts. (Dental Branch) :—F. R. McCubbley, May 24th; R. Fyson, May 25th.

Memoranda.—The following relinquish their commns. on ceasing to be empld. :—C. J. Killeen (Lt., Worc. R.), April 2nd R. S. J. Dynes, May 2nd; A. L. Mercer (Lt., Nova Scotia R., C.M.F.), May 21st.

War Office, June 1st.

REGULAR FORCES.—Establishments. — R.F.C. — Mil. Wing.—Flt. Comdr.—Capt. (temp. Maj.) C. M. Crowe, M.C., Spec. Res., reverts from a Sqdn. Comdr., and relinquishes his temp. rank, Feb. 6th, seny. Oct. 14th, 1915.

The following appts. are made :—Special Appt. (graded as a Park Comdr.).—Temp. Capt. C. W. M. Ludgate, Gen. List from an Equipt. Officer, 1st Cl., and to be temp. Maj. while specially empld., March 31st.

War Office, June 3rd.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing—Adjt.—Capt. C. A. M. Holloway, R. W. Kent R., Feb. 22nd.

Equipt. Officer, 1st Cl.—Temp. Lt. W. T. Taylor, Gen. List from a Balloon Comdr. (graded as a Balloon Officer), and to be temp. Capt. while so empld., March 26th.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to appoint Brig.-Gen. John George, Duke of Atholl C.B., M.V.O., D.S.O., to be a Knight of the Most Ancient and Most Noble Order of the Thistle.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to give orders for the following appointments to the Most Honourable Order of the Bath for services rendered in connection with the war :—

K.C.B. (Civil Division).

Sir Howard George Frank, Director-General of Lands, War Office, Ministry of Munitions and Air Ministry.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to give orders for the following appointment to the Most Honourable Order of the Bath, in recognition of distinguished services rendered during the war :—

C.B. (Military Division).

Col. (temp. Brig.-Gen. Arthur Vyell Vyvyan, D.S.O., R.A.F.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to give directions for the following appointments to the

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)

Most Distinguished Order of Saint Michael and Saint George, in recognition of distinguished services rendered in connection with the war :—

C.M.G.

Lt.-Col. (temp. Brig.-Gen.) William Ward Warner, R.A.F.
Lt.-Col. (temp. Brig.-Gen.) Bertie Clephane Hawley Drew, R.A.F.
Lt.-Col. John Cyril Porte, R.A.F.
Lt.-Col. (temp. Brig.-Gen.) Cuthbert Gurney Hoare, R.A.F.
Lt.-Col. (temp. Brig.-Gen.) Alfred Huggins, D.S.O., R.A.F.
Maj. (temp. Lt.-Col.) Ralph Kirby Bagnall Wild, R.A.F.
Maj. (temp. Lt.-Col.) Charles Frederick Lee, R.A.F.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to give directions for the following appointment to the Most Distinguished Order of Saint Michael and Saint George, in recognition of distinguished service in a theatre of war :—

C.M.G.

Lt.-Col. (temp. Brig.-Gen.) John Harold Whitworth Becke, D.S.O., R.A.F.

War Office, June 3rd.

The King has been pleased, on the occasion of his Majesty's Birthday to approve of the undermentioned rewards for distinguished service in connection with military operations in France and Flanders (dated June 3rd, 1918) :—

To be Brevet Colonel.

Maj. and Bt. Lt.-Col. (temp. Brig.-Gen.) H. R. M. Brooke-Popham, D.S.O. Oxf. and Bucks L.I. and R.A.F.
Maj. and Bt. Lt.-Col. (temp. Brig.-Gen.) F. L. Festing, C.M.G., Northd. Fus. and R.A.F.

To be Brevet Major.

Capt. (temp. Col.) G. B. Hynes, D.S.O., R.A. and R.A.F.

Air Ministry, June 3rd.

The King has been pleased, on the occasion of his Majesty's Birthday, to institute two decorations to be awarded to officers and warrant officers in the Royal Air Force, and two medals to be awarded to non-commissioned officers and men in the Royal Air Force. They are :—

"The Distinguished Flying Cross," to be awarded to officers and warrant officers for acts of gallantry when flying in active operations against the enemy.

"The Air Force Cross," to be awarded to officers and warrant officers for acts of courage or devotion to duty when flying, although not in active operations against the enemy.

"The Distinguished Flying Medal," to be awarded to non-commissioned officers and men for acts of gallantry when flying in active operations against the enemy.

"The Air Force Medal," to be awarded to non-commissioned officers and men for acts of courage or devotion to duty when flying, although not in active operations against the enemy.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to confer the following rewards for distinguished service :—

ROYAL AIR FORCE.

Distinguished Service Order.

Maj. (temp. Lt.-Col.) John Eustace Arthur Baldwin.
Maj. (temp. Lt.-Col.) Arthur Courtney Boddam-Whetham.
Capt. (temp. Maj.) Benjamin Henry Noel Hans Hamilton.
Maj. Alwyn Vesey Holt.
Capt. (temp. Maj.) Warwick Wright.

Distinguished Flying Cross.

Lt. (Hon. Capt.) William Hopton Anderson, A.F.C.
Lt. David Claud Bauer.
Lt. (Hon. Capt.) Claver Victor Bessett.
Lt. (temp. Capt.) Robert Alexander Birkbeck
Lt. John Geoffrey Sadler Candy.
Lt. (temp. Capt.) Bernard Purvis Broackes Carter.
Lt. Douglas Colyer.
Capt. Robert John Orton Compston, D.S.C.
Lt. Maurice Lea Cooper.
Maj. Jack Armand Cunningham.
Capt. Roydon Englefield Ashford Dash.
Lt. (temp. Capt.) John Charles Oswald Dickson.
Lt. Thomas Howell French.
Lt. George Cecil Gardner.
Lt. (Hon. Capt.) Harold Harrison Gonyou.
Lt. John Edmund Greene.
Lt. (temp. Capt.) Frederick George Darby Hards, D.S.C.
Lt. Francis Herbert Ronald Henwood.
Lt. Gordon Frank Hyams.
Capt. Allen Murray Jones, M.C., A.F.C.
Lt. (temp. Capt.) Ernest James Jones, A.F.C.
Lt. (temp. Capt.) Harold Aidan Laycock.
Lt. George Chisholme Mackay.
Lt. (temp. Capt.) William Man.
Lt. (temp. Capt.) John Stanley Fleming Morrison.
Lt. Philip John Nolan.
Lt. (Hon. Capt.) Thomas Cooper Pattinson.
Lt. (Hon. Capt.) Arthur Henry Pearce.
Lt. (temp. Capt.) Edward Robert Pennell.
Lt. (Hon. Capt.) Samuel Richard Penrose-Welsted.
Lt. (Hon. Capt.) Cecil Lodge Philcox.
Lt. (Hon. Capt.) John William Pinder.
Capt. John Robinson.
Lt. Charles Basil Slater Spackman.
Capt. (temp. Maj.) David Edmund Stodart.
Lt. Denys Lane Paschel Stuart Stuart-Shepherd.
Lt. Leonard Thomas Eaton Taplin, A.F.C.
Capt. (temp. Maj.) Awdry Morris Vaucour, M.C.
Lt. (Hon. Capt.) Stephen Wynne Vickers, M.C.
Lt. (temp. Capt.) William Young Walls.
Lt. (temp. Capt.) Bert Sterling Wemp.
Lt. Laurence Arthur Wingfield.
Lt. Basil Raymond Worthington.
Lt. (temp. Capt.) George Frederick William Zimmer.

Air Force Cross.

Lt. (temp. Capt.) Valentine Henry Baker, M.C.
Capt. (temp. Lt.-Col.) Robert Benedict Bourdillon, M.C.
Maj.-Gen. William Sefton Brancker.
Maj. (temp. Col.) Charles Dempster Breese.
Lt. (temp. Capt.) Henry Duncan Davis.
Lt. Robert William Dobbie.
Lt. Llewellyan Lewis Meredith Evans.
Maj. (temp. Col.) The Honourable William Francis Forbes-Sempill, Master of Sempill.
Capt. Percy Edward Lovell Gethin.
Lt.-Col. (temp. Brig.-Gen.) Robert Marsland Groves, D.S.O.
Lt. Thomas Hayes.
Lt. (temp. Capt.) Albert Goodeff Henshaw.
Capt. (temp. Maj.) Bennett Melville Jones.
Lt. Walter Hunt Longton.
Lt. Archibald Charles Lutyens, M.C.
Lt. Laurence Newton Mitchell.
Lt. John Oliver.
Capt. (temp. Maj.) Humphrey Rivaz Raikes.
Maj. (temp. Lt.-Col.) Robert Raymond Smith-Barry.
Lt. Charles Gordon Sturt.
Lt. Terence Bernard Tully.

Distinguished Flying Medal.

F/9689 Actg. Air Mech. W/T. Albert Edward Clark (Woodford).
113763 Serjt. John Charles Hagan (Ulverston).

Air Force Medal.

11680 Serjt. Samuel James Mitchell (Handsworth, Birmingham).
106100 Serjt. Frederick Charles Tucker (Birtley, Durham).

Meritorious Service Medal.

2875 Flt. Serjt. J. C. Alexander (Billericay, Essex); 5195 Flt. Serjt. F. T. Angell (Crowthorne, Berks); 15252 Cpl. (actg. Serjt. A. W. Ashbee (Keynsham, Bristol); 5705 Cpl. R. E. Ashbol (Ilford).

246 Temp. Serjt.-Maj. C. W. Baker (Pewsey, Wilts); 3642 Cpl. W. N. Baldwin (Grimsargh, Lancs.); 33948 Flt. Serjt. D Barnett (Birkenhead); 3481 Serjt. (temp. Serjt.-Maj.) J. W. Benson (Leeds); 16008 Temp. Serjt.-Maj. J. F. Bentley (Bow London); 8886 Temp. Serjt.-Maj. J. F. Biggs (Isleworth); 23 Temp. Serjt.-Maj. B. Billing (Bury St. Edmunds); 22996 Flt Serjt. S. F. Bonnett (Bedford); 3908 Serjt. G. H. Bowater (Wes Bromwich); 10730 Cpl. R. W. Broom (Cromer); 15615 Cpl. H T. Brown (Fulham); 10149 Flt. Serjt. R. C. Bruce (Bristol) 43511 1st A.M. G. E. Bryant (West Ealing); 17536 1st A.M. H Burman (Walthamstow); 24086 Temp. Serjt.-Maj. B. C. Burnet (Enfield).

629 Temp. Serjt.-Maj. H. Carrington (Norwich); 90 Temp Serjt.-Maj. C. S. Carden (Enfield); 4741 Flt. Serjt. F. W. C Catchpole (Maidstone); 29063 Temp. Serjt.-Maj. P. J. C. Clark (Wallasey); 11712 Flt. Serjt. J. E. Clifton (Birmingham); 1195 Serjt. H. Collins (Eastbourne); 36034 Temp. Serjt.-Maj. C. H Cooper (Hammersmith); 1953 Temp. Serjt.-Maj. E. H. Cooper (Shoreham); 188 Serjt. (temp. Serjt.-Maj.) E. E. Copper (Beckenham, Kent); 2302 Temp. Serjt.-Maj. A. R. Cox (Gosport); 12651 Cpl. H. W. Crawford (Redcar); 4316 Flt. Serjt. A. Creighton (Lancaster).

30054 Cpl. A. W. T. Davey (Highgate); 11254 Flt. Serjt. R. Dickenson (Salford).

1745 Temp. Serjt.-Maj. W. Eccles (Stockport).

8457 Flt. Serjt. W. H. Finch (Waltham Cross); 4248 Flt. Serjt. C. F. Ford (Chichester); 10232 Flt. Serjt. F. G. Ford (Brixton).

2673 Serjt. (actg. Flt. Serjt.) A. Gibson (Maidstone); 22645 1st A.M. A. R. Gilbert (Kilburn); 8398 Temp. Serjt.-Maj. G. Gillman (Farnham); 49095 Cpl. T. J. G. Grout (East Dulwich).

11442 Cpl. R. A. R. Hill (King's Cross); F/405 P.O. Mech. J. W. Hodgson (York); 45311 Temp. Serjt.-Maj. J. J. Hollyhead, M.M. (Malvern); 6360 Serjt. A. H. M. Hoy (Winsley, Wilts); 23280 Flt. Serjt. S. E. Hughes (Tufnell Park, N.); 19479 Serjt. O. G. Hunter (Hendon).

20236 Temp. Serjt.-Maj. C. W. James (Plumstead); 320 Serjt.-Maj. H. James, M.M. (Eltham, Kent); 321 Temp. Serjt.-Maj.

WESTLAND Aircraft.

BRANCH OF PETTERS LIMTD.

YEOVIL.

Phone: Yeovil 141. Telegram: Aircraft, Yeovil.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

A. Jarman (Plumstead); 12565 Cpl. M. D. Jones (Godrergraig, Glam.).

24846 Serjt. J. Kerr (Paisley); 18609 Flt. Serjt. F. W. Kirby (Wortham, Suffolk).

7914 Flt. Serjt. W. A. Legg (Cullen, Banffshire).

404020 Cpl. J. C. McMichael (Gatehouse, N.B.); 30513 Serjt. C. L. Marks (Lewisham); 16211 Flt. Serjt. F. B. Matthews (Portsmouth); 167 Flt. Serjt. (temp. Serjt.-Maj.) A. R. May (Plumstead); 1464 Temp. Serjt.-Maj. S. H. May (Folkestone); 1607 Flt. Serjt. R. H. Millman (Lower Edmonton).

26692 Flt. Serjt. A. S. Norman (Cove, Hants); 14088 1st A.M. J. Needham (Alderley Edge, Cheshire).

1518 Temp. Serjt.-Maj. E. S. Olney (Willesden, N.W.); 18629 Temp. Serjt.-Maj. A. W. Osborne (Westcliff); 942 Serjt. (temp. Serjt.-Maj. C. J. O'Toole (Dublin); 25960 1st A.M. S. Owen (Armedale, Midlothian).

4960 Temp. Serjt.-Maj. J. J. Pathe (Carrigalong Biss, Co. Tipperary); 10700 1st A.M. R. Peacock (Morecambe); 6468 Flt. Serjt. L. Pellatt (Whitehaven, Cumberland); 37965 Cpl. J. Phillips (Leeds); 3642 Cpl. L. Poole (Leeds).

10515 Serjt. W. H. Roberts (Merthyr); 28924 Serjt. J. C. Robertson (West Hampstead); 943 Temp. Serjt.-Maj. J. Robinson (Gillingham); 25765 Cpl. P. Roche (Rochdale); 18319 Flt. Serjt. S. C. Rogers (Highgate); 15098 1st A.M. J. Rundle (Par, Cornwall); 14047 Flt. Serjt. W. J. Ryman (Hersham, Surrey).

30214 Flt. Serjt. S. J. Scott (Wandsworth); 29690 Flt. Serjt. W. Scott (Dysart); 59337 2nd A.M. G. Shaylor (Hornsey); 32399 Flt. Serjt. F. Shipman (Sheffield); 2039 Temp. Serjt.-Maj. J. H. Shone (Bangor); 467 Temp. Serjt.-Maj. E. Smalley (Liverpool); 55477 2nd A.M. A. E. Smith (Reading); 26072 1st A.M. E. Stevens (Basingstoke); 1626 Flt. Serjt. J. Stevenson (Stourbridge); 78312 Temp. Serjt.-Maj. H. L. Stidworthy (Edmonton); 16919 Cpl. E. G. Strange (Wootton Bassett, Wilts); 403928 Cpl. G. F. Surtees (Mill-on-Lyne); 15566 Cpl. F. Swift (Bradford).

29564 Cpl. A. Tarlington (Sparkbrook); 16625 Flt. Serjt. G. Thom (Alloa); 57895 Serjt. C. J. Thompson (London, W.); 7759 1st A.M. H. W. Triggs (Nunhead, S.E.); F/14193 C.P.O. W. J. Tuckwell (Henley-on-Thames).

126 Flt. Serjt. J. Waeland (Canning Town); 8387 Serjt. C. G. Ward (Rochester); F/385 C.P.O. 3rd Gr. (E.) A. J.; Wheeler (Felixstowe); 45811 Flt. Serjt. A. Wilkinson (Manchester); 30216 Flt. Serjt. F. W. Winter (Croydon); 1452 Serjt. (temp. Serjt.-Maj.) G. H. Withers (Ripon); 3882 Flt. Serjt. J. Wright (Glasgow); 6309 1st A.M. (actg. Cpl.) L. Wright (Woking).

MENTIONS IN DISPATCHES.

The following officers and other ranks of the Royal Air Force have been mentioned in dispatches and reports for distinguished services :—

Capt. (temp. Maj.) W. H. Adkins; Ensign F. G. Allen (U.S. Naval Air Service); Lt.-Col. R. J. Armes; Lt. (temp Capt.) E. A. O. Auldjo-Jamieson.

Maj. (temp. Lt.-Col.) R. K. Bagnall-Wild; Lt. (Hon. Capt.) H. J. Bath; Maj. (temp. Lt.-Col.) A. W. Bigsworth, D.S.O.; Capt. C. G. Beatson; Lt. (temp. Capt.) S. Bell; Maj. (temp. Lt.-Col.) E. G. O. Bcuttler; Lt. (Hon. Capt.) A. G. Bishop; Lt. T. H. Boyd.

Lt. (Hon. Capt.) C. J. Clayton; Lt. (temp. Capt.) F. Cleary; Lt. (temp. Capt.) J. P. Coleman; Lt. J. P. Colin, M.C.; Capt. G. M. Croil.

Lt. (temp. Capt.) C. Death; Lt.-Col. (temp. Brig.-Gen.) B. C. H. Drew; Sec. Lt. W. H. Dunton; Lt. (temp. Capt.) A. Durston.

Lt. (Hon. Capt.) D. S. Earp; Lt. (Hon. Capt.) W. H. Evens.

Lt. (temp. Capt.) H. G. Ford; Lt. (temp. Capt.) J. Fowler.

Lt. (temp. Capt.) J. O. Galpin, D.S.C.; Capt. J. Gardiner; Lt. (Hon. Capt.) E. S. Goodwin; Sec. Lt. R. Gowing; Lt. (temp. Capt.) P. G. Gundry.

Capt. (temp. Maj.) T. D. Hallam, D.S.C.; Lt. (temp. Capt.) A. H. Handman; Sec. Lt. W. J. Harris; Lt. (Hon. Capt.) C. S. Hay; Capt. F. W. Hill; Lt.-Col. (temp. Brig.-Gen.) C. G. Hoare; Lt. (Hon. Capt.) A. Holland; Lt.-Col (temp. Brig.-Gen.) A. Huggins, D.S.O.

Flt. Observer W. B. L. Jones (deceased).

Lt. H. B. Kerruish; Maj. (temp. Lt.-Col.) C. F. Kilner, D.S.O.

Lt. (temp. Capt.) C. F. Latimer; Maj. (temp. Lt.-Col.) C. F. Lee; Lt. (Hon. Capt.) H. A. H. Leetham; Lt. (temp. Capt.) F. J. Linnell.

Lt. (Hon. Capt.) A. J. H. MacColl; Lt. H. L. Macro; Lt. (Hon. Capt.) N. A. Magor, D.S.C.; Maj. (temp. Lt.-Col.) F.K. McClean; Lt. (temp. Capt.) W. G. McMinnies; Lt. (Hon. Capt.) B. A. Malet; Lt. (temp. Capt.), T. Martin; Capt. (temp. Maj.) J. D. Maude; Sec. Lt. J. F. Mehigan; Capt. (temp. Maj.) G. A. N. Mitchell; Capt. (temp. Maj.) R. F. S. Morton; Lt. (temp. Maj.) A. Murray.

Capt. (temp. Maj.) C. H. Nicholas.

Maj. E. Osmond.

Maj. (temp. Lt.-Col.) R. E. C. Peirse, D.S.O.; Lt.-Col. J. C. Porte.

Lt. (Hon. Capt.) C. A. Rea; Lt. (Hon. Capt.) L. Ritson.

Lt. (temp. Capt.) C. W. Scott; Lt. (temp. Capt.) L. G. Scott.

Lt. (temp. Capt.) H. Thrower; Lt. K. C. Tilman; Sec. Lt. J. Tozer-Mitchell.

Col. (temp. Brig. Gen.) A. V. Vyvyan, D.S.O.

Lt.-Col. (temp. Brig.-Gen.) W. W. Warner; Lt. (temp. Capt.) J. S. Wheelwright, D.S.C.; Maj. H. Wyllie.

F/20540 Actg. 1st Air Mech. R. Bance; 18238 1st Air Mech. F. C. Cattermole; F./5665 C.P.O. 3 (E.) A. Fensom; F./6637 C.P.O. 3 (E.) W. J. Goodchild; Ch./17014 C.P.O. 3 (W./T.) E. A. Homer; 31026 1st Air Mech. R. H. Ibbertson; F./611 C.P.O. 3 (C.) E. W. Monk; 12368 Cpl. H. R. E. Sanders.

FROM THE COURT CIRCULAR.

BUCKINGHAM PALACE, June 1st.

His Majesty, who was accompanied by Field-Marshal the Duke of Connaught, held an Investiture in the Quadrangle of the Palace.

The following were severally introduced into the presence of The King, when His Majesty conferred decorations as follows :—

THE DISTINGUISHED SERVICE CROSS.—Capt. Aubrey Ellwood, R.A.F.; Capt. Bertie Millson, R.A.F.

THE MILITARY CROSS.—Capt. Ralph Brown, R.A.F.; Capt. Lionel Payne, R.A.F.; Lt. Frederick Burdick; R.A.F.; Lt. Ernest Gardiner, the King's (Liverpool Regt.), attd. R.A.F.

OFFICIAL COMMUNIQUES.

NAVAL.

ADMIRALTY COMMUNIQUÉS.

JUNE 2nd.—Photographic reconnaissance of Zebrugge shows clearly a submarine or other vessel lying on her bilge close to the Mole. This vessel was probably sunk by torpedo from the "North Star" on the night of April 23rd. The reconnaissance shows, also, a destroyer with her deck nearly awash at low water about 300 yards from the Mole. This is presumably the destroyer sunk by bomb from an aeroplane on May 20th.

JUNE 3rd.—During the period, May 30th to June 2nd inclusive, bombing raids have been carried out night and day on the following military objectives :—Bruges Docks, Zeebrugge, Ostend.

Several tons of heavy bombs were dropped on the objectives, with good results. Photographs confirm great damage at the large engineering works, Bruges.

Three enemy machines were brought down in flames, and a further three driven down out of control.

Three of our machines are missing.

In Home Waters, during the above period, numerous anti-submarine and escort patrols were carried out, and long reconnaissances made across the North Sea. Submarines were sighted and attacked, and enemy mines were located on several occasions.

During a North Sea patrol a Zeppelin was sighted and chased, but our seaplane was unable to get sufficiently near to engage her effectively.

One of our seaplanes is missing.

MILITARY.

G.H.Q. COMMUNIQUÉS.

MAY 28th, 9.7 p.m.—On the 27th inst. the weather was generally fine but cloudy, and visibility was not good. However, a full day's work was done by our aeroplanes both in co-operation with the artillery and in photography and bombing.

Sixteen tons of bombs were dropped by us in the course of the day on various objectives, including billets between Armentières and Lens, and on the docks at Bruges.

Fifteen German machines were destroyed by our aviators, and three were driven down out of control.

Two of our machines are missing.

On the night of the 27th-28th inst. heavy bombs were dropped by us on Zeebrugge lock and Bruges docks. A great number of dumps and billets behind the enemy's lines were also bombed. A total weight of 21 tons of bombs was used in these different attacks.

All the aeroplanes engaged in this work returned safely.

Hostile night-bombing machines were active over our back areas. A Gotha aeroplane was forced to descend behind our lines and its three occupants were captured.

On the same night our long-distance bombing machines were very active, and dropped between four and five tons of bombs on the chemical works at Mannheim, on Landau railway station, the electric power station at Kreuzwald (near Saarbrücken), on Metz-Sablon railway station, and Courcelles railway station. Some very large explosions were caused.

All machines, except one, returned safely.

MAY 29th, 9.25 p.m.—On the 28th inst. fine weather enabled our aeroplanes and balloons to accomplish a full day's work.

Besides co-operation with the artillery and photographic reconnaissance, our aeroplanes dropped 25 tons of bombs during the day on hostile billets, dumps, railways, and aerodromes behind the enemy's lines on all parts of the British front

Thirteen German machines were destroyed in air fighting, and four others were driven down out of control.

Five of our aeroplanes are missing.

Bombing was continued on the night of the 28th-29th inst.

(*Continued on page* 2109.)

ROLLS-ROYCE

What Rolls-Royce Ltd. have done in the War

THEY HAVE supplied their world-renowned Aero Engines in continually increasing numbers.

THEY HAVE received considerably smaller profits than in peace times.

THEY HAVE unreservedly placed their expert knowledge at the disposal of Allies, from whom they have received grateful acknowledgment.

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

AIRCRAFT MANUFACTURING COMPANY——LIMITED

Contractors to

War Office and Admiralty

London Office

27, BUCKINGHAM GATE, S.W.1.

And at

HENDON, N.W.9.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN :

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 5456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCED S, WEYBRIDGE."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

REPORT ON A.E.G. BOMBER, G.105.

Issued by the Technical Department of the Department of Aircraft Production, Ministry of Munitions.

This machine was brought down by anti-aircraft fire at Achiet-le-Grand on 23/12/17.

On a label protected by celluloid, mounted on a tube in the nacelle, is the legend—"Abnahme am (Accepted on) 10/11/17."

This machine, whilst carrying a similar power plant, is very different in construction from the Gotha type, which also embraces the Friedrichshafen Bomber reported on in I.C. 619.

Whereas the latter is generally constructed of wood, ply wood being used to a very large extent throughout, in the A.E.G. steel is almost universally employed, not only in regard to the fuselage, nacelle, subsidiary surfaces and landing gear, but also in the wings themselves.

Needless to say, acetylene welding is freely resorted to throughout the construction, which, however, appears to be far from light.

On the whole, the A.E.G. aeroplane, judged by contemporary British standards of design, is decidedly clumsy, not only in detail work, but also in appearance. The performance is poor.

The leading particulars of the machine are as follows:—

Weight empty	5258 lbs.
Total weight	7130 lbs.
Area of upper wings	395.2 sq. ft.
,, ,, lower ,, ...	335.2 sq. ft.
Total area of ,, ...	730.4 sq. ft
Loading per square foot of wing surface	9.77 lbs. per sq. ft.
Area of ailerons, each	17.9 sq. ft.
,, ,, balance of aileron ...	1.8 sq. ft.
Area of tail plane	34.0 sq. ft.
Area of fin	11.5 sq. ft.
,, ,, rudder	20.8 sq. ft
Balanced area of rudder... ...	2.6 sq. ft
Area of elevators	31.2 sq. ft.
Balanced area of elevators ...	3.6 sq. ft.
Horizontal area of body... ...	206.4 sq. ft.
Vertical area of body	209.2 sq. ft
Total weight per horse power ...	13.7 lbs. approx.
Crew—Pilot and two passengers	540 lbs.
Armament	2 guns.
Engines	2 260-h.p. Mercédès.
Petrol capacity	123 gallons = 861 lbs.
Oil capacity	11 gallons = 110 lbs.
Water capacity	13 gallons = 130 lbs.

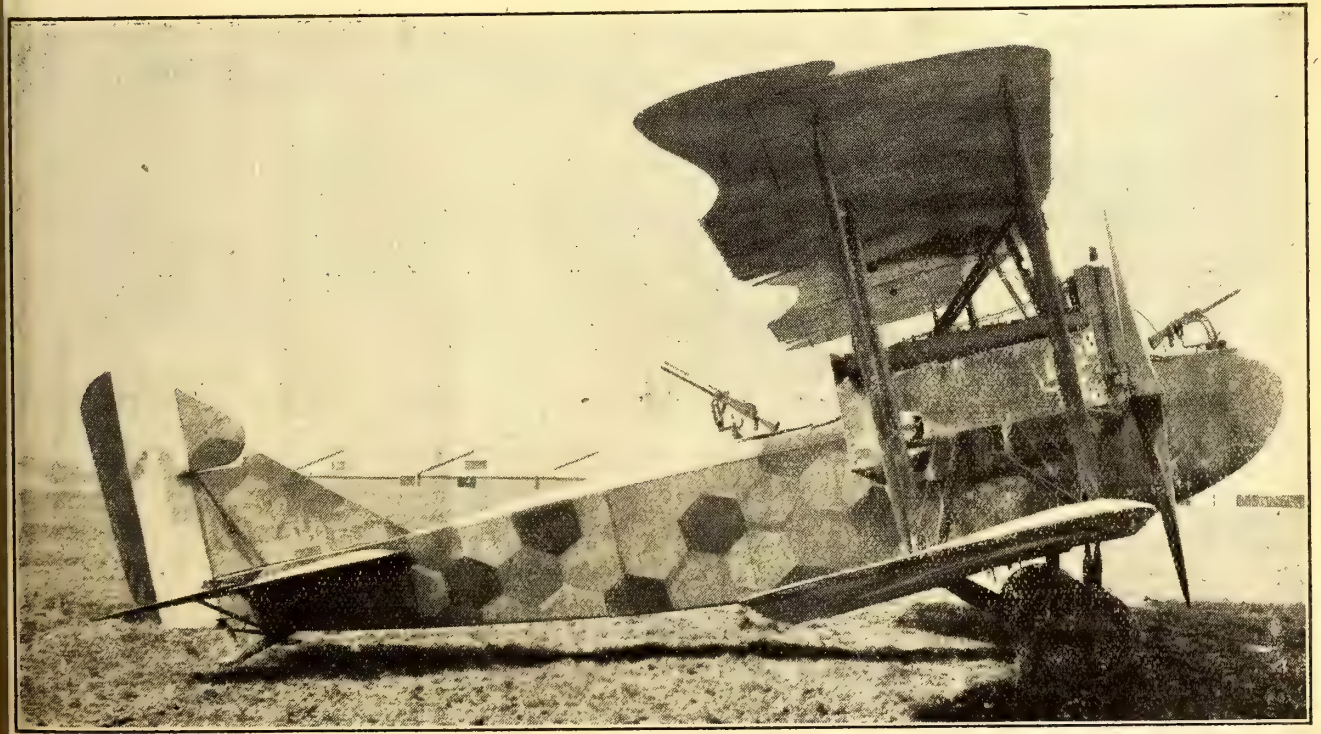
Other dimensions are also shown on the drawings at the end of the Report.

Performance.

(*a*) Climb, 5,000 ft. in 10.3 Mins.
Rate of climb at 5,000 ft.—390 ft. per min.
Climb, 9,000 ft. in 23.4 mins.
Rate of climb at 9,000 ft.—235 ft. per min.

(*b*) Speed at Heights.
Level to 5,000 ft.—90 miles per hour approximately.
At 9,000 ft.—86 ,, ,, ,, ,,

(*c*) Landing Speed.
The aeroplane is best landed at a speed between 75 and 80 miles an hour; after flattening out it sinks to the ground quickly and pulls up rapidly.



(1.) Side View of the A.E.G. Bomber. The curious camouflage is to be noted, also the scalloped ailerons, which appear to be a kind of trademark of the A.E.G.
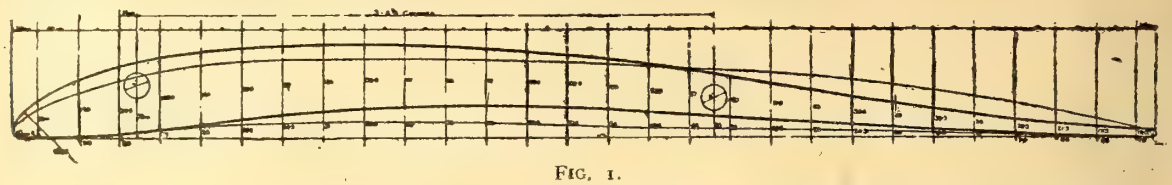


Fig. 1.

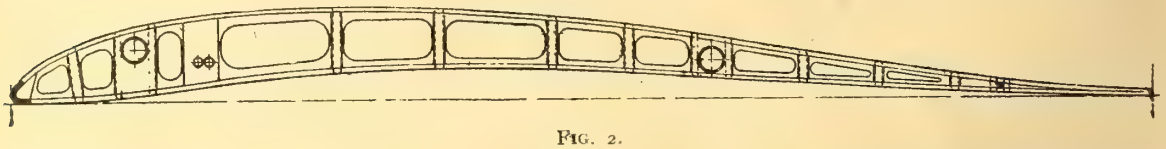


Fig. 2.

(*d*) Control.

1. Lateral—Good.
2. Elevators—Bad, especially when landing.

Note.—It is stated that it is not advisable to fly this machine without a passenger in the front seat.

Construction.

Wings.—As will be seen from the scale drawings, the wings are of characteristic form. The central portion consists of a rectangular centre cell permanently attached to the fuselage.

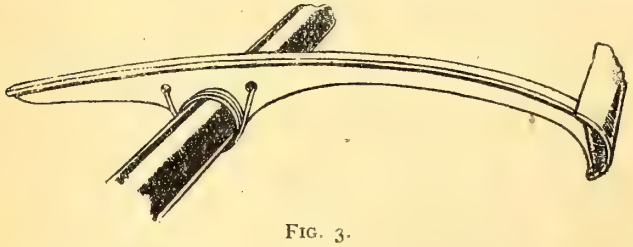


Fig. 3.

The lower wings support the engines. In this centre cell the planes are set horizontally. At each side of it the lower main planes are swept upwards with a vertical dihedral of 2.75°, the top planes being kept flat, and both main planes are swept backwards in the horizontal plane to an angle of 4° for the bottom plane and 3° for the top plane. As the central portion of the upper main plane has 4 inches of negative stagger relative to the bottom plane, this difference in angle brings their tips practically vertically over one another. The angle of incidence

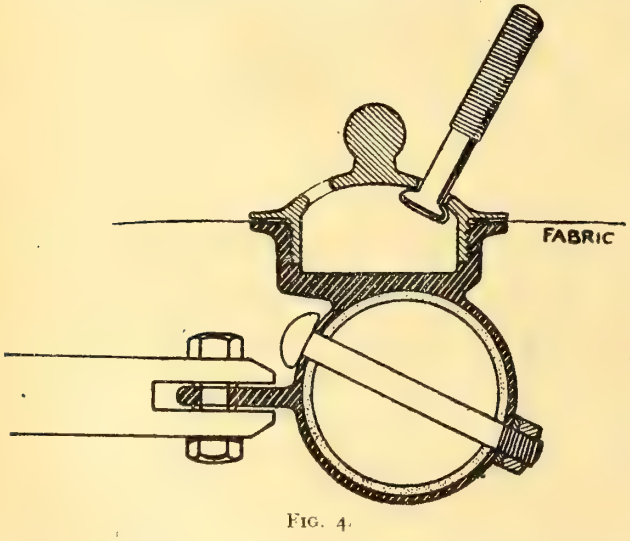


Fig. 4.

attains a maximum of 4° at the base of the engine struts, i.e., 7 ft. 10⅜ inches from the centre. At the second strut the angle is 3½° and at the end strut 2½°. These angles are painted in circles on the surface of the planes, evidently for the convenience of riggers. The camber of both planes is washed out gradually towards the tips, and a representative section of the main planes taken at the junction of the engine bearer struts is given in Fig. 1. For purposes of reference the R.A.F.14 section is superimposed. This figure also shows the position of the main spars which are of steel tube. These are 50 mms. in outside diameter, but their wall thickness is not at present known. In order to allow the thinning down of the wing section, these tubes are flattened out towards the extremity of the wing. They are chamfered down to a narrow end and a flat plate acetylene welded on to each side; thus at the spar tip the section is roughly rectangular. The main spars are kept parallel throughout the whole of their length and are attached to the central cell by means of pin joints, similar to those on the Friedrichshafen. The ribs are of solid wood and are constructed as shown in Fig. 2. It is rather notable in comparison with other German machines of all types that ply wood is almost entirely absent. In the A.E.G. construction the rib webs are perforated and strengthened by wooden uprights at intervals and are glued into a grooved flange. The ribs are placed 300 mms.—325 mms. apart—and are not directly or firmly attached to the spars on which they are a relatively loose fit. Passing through the ribs of the bottom plane and extending from their junction with the centre section to the extreme outside strut are two steel tubes, approximately 17 mms. in diameter, which act as housings for the aileron control wires. These tubes are very strong, and it is thought possible that they are also counted upon to lend rigidity to the wing structure. The leading edge, which is of the usual semi-circular section, acts as a distance piece, as also does the wire trailing edge. Thirteen inches in front of the last named is a stringer formed of a steel rod. Apart from this, the spars are the only longitudinal members of the wings. Between the main ribs are false ribs running from the leading edge to a point a few inches behind the leading spar and applying only to the upper surface. One of these false ribs is sketched in Fig. 3. It is secured as shown in the sketch by means of a semi-circular saddle and a wrapping of tape which passes as shown through holes in the rib. Where it meets the leading edge it is furnished with triangular packing pieces, which locate and hold it in position. The lower plane is covered as to its upper surface with sheet metal immediately under the engines, whilst between them and the fuselage is fixed a strip of corrugated aluminium which acts as a footway. The fabric is attached in the usual manner and is stitched to the ribs both top and bottom. The two surfaces are stitched together behind the metal rod, which acts as a stringer, and by this means the actual trailing edge wire is relieved of a certain amount of tension. The wing structure is internally braced by means of steel tubular cross-pieces and stranded cables. A single fitting is employed for the attachment of the interplane struts and for that of the bracing tubes. This fitting is shown in Fig. 4. It is a tight fit on the spar, to which it is fixed by a bolt, and is formed with an extension lug which acts, as shown, as an anchorage for the bracing tube, whilst a sideways extension of the same lug carries an eye for the bracing wire. It is provided with a cup-shaped upper extension, into which there is screwed a steel dome which carries the ball of the strut socket fitting and also acts as a wiring plate for the interplane bracing wires. As shown in the sketch, the fabric is run into the space between the upper and lower flanges of this fitting, the whole making a very neat job.

Struts.

These are of streamline section steel tube and of uniform dimensions throughout. The section is 92 mms. long by 48 mms. broad. The ends are sharply tapered down, and into them is welded a cupped ferrule which drops on to the ball shown in sketch Fig. 4, and is there held in position by a cotter-pin. The attachment is shown complete in Fig. 5. This joint gives a considerable range of lateral freedom, as is the usual practice on machines of German design.

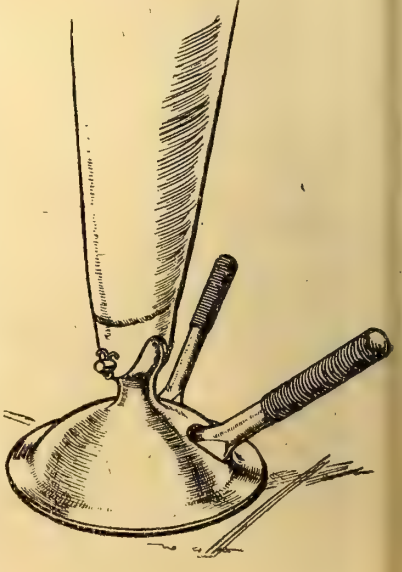
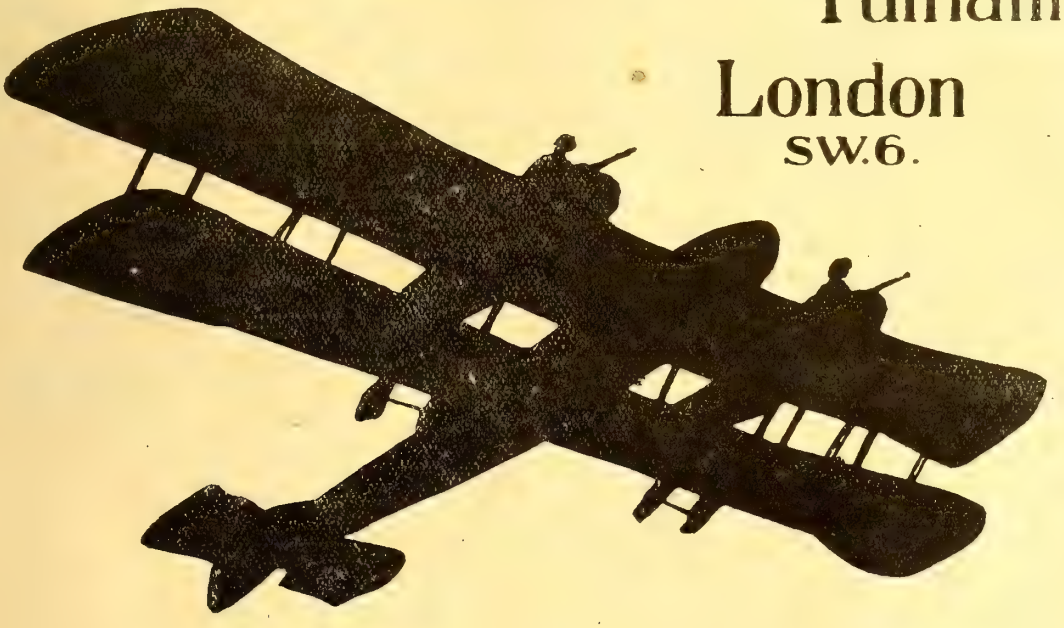


Fig. 5.

AERONAUTICAL ENGINEERS TO H.M. GOVERNMENT.

THE
REGENT
CARRIAGE Co LTD

Fulham
London
SW.6.



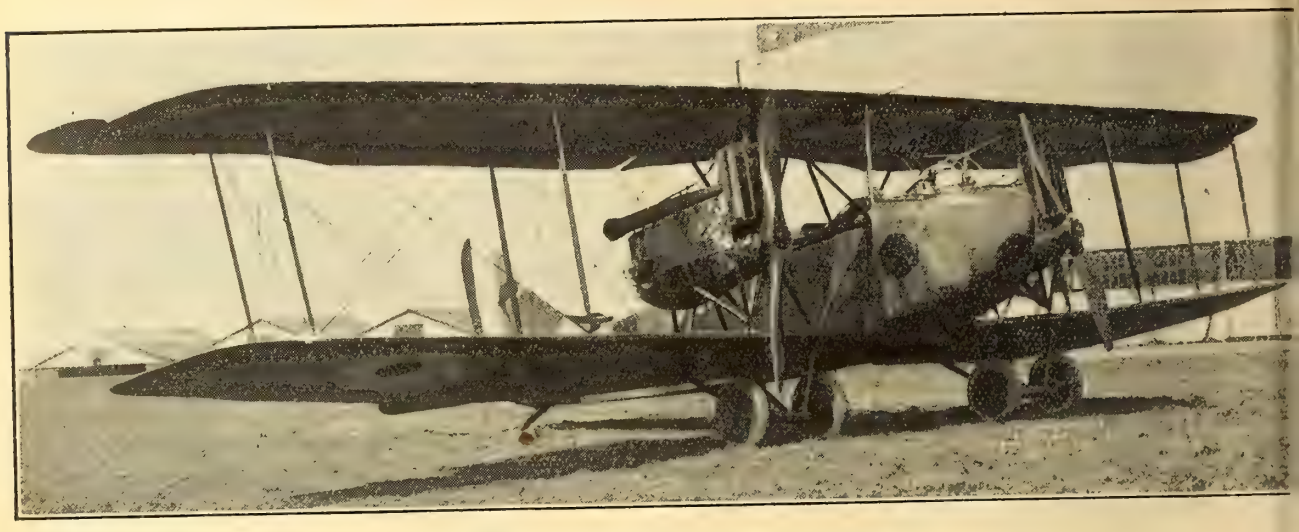


KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

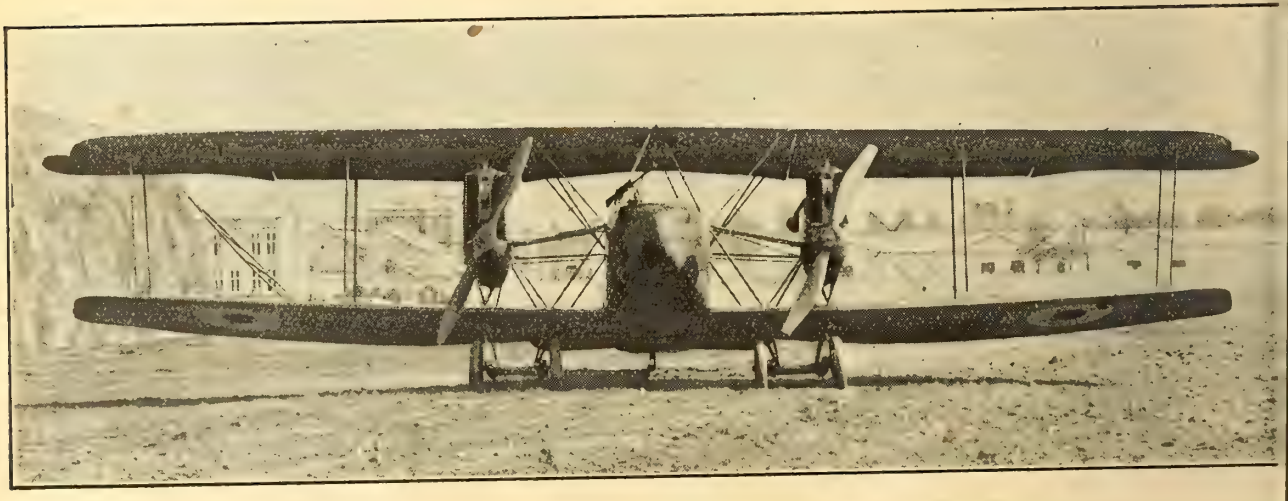
Fuselage.

The whole of the fuselage is built up of steel tubes welded together. It is of plain rectangular section and the cross tubes are attached directly to the main booms without the intervention of any clips. This detail of construction is shown in Fig. 6, which also illustrates the single and double lugs which are used for the purpose of securing the bracing wires. Under the nacelle and in the neighbourhood of the main petrol tanks and the bomb racks the fuselage is reinforced with thin tubular steel tie-rods.

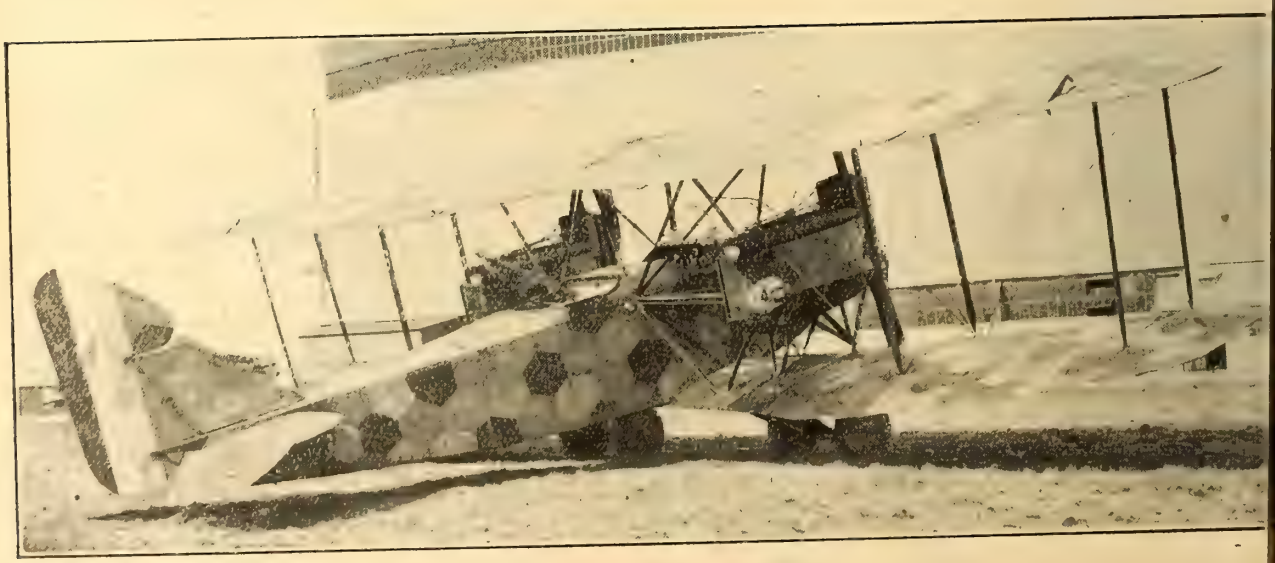
Fig. 7 shows the manner in which the upper booms of the fuse lage are provided with sockets for the inclined struts of the centra cell. The fitting consists of two circular steel plates welded int position to form an integral part of the frame joint, the fron one of these flanges being provided with lugs for the anchorag of bracing cables. The inclined struts are secured by a ring o short set screws wired together as shown. If appearances are t be trusted, this form of attachment, whilst being strong and con venient, is excessively heavy. Unlike the practice which is pur



(B) Three-quarter Front View of the A.E.G. Bomber.



(C) Front View.



(D) Three-quarter Rear View.

Telephone:—
OFFICE ... 912 REGENT.
WORKS ... 4762 KENSINGTON.
281-2-3 WEMBLEY.

Telegrams:—
"SOCIABLE, PHONE, LONDON."

HOOPER & CO. LTD.

AEROPLANE BUILDERS TO H.M. AIR COUNCIL.

MOTOR-BODY BUILDERS

TO

BY ROYAL WARRANT.

BY ROYAL WARRANT.

BY ROYAL WARRANT.

HIS MAJESTY THE KING.
HER MAJESTY THE QUEEN.
HER MAJESTY QUEEN ALEXANDRA.
H.I.M. MARIE DOWAGER EMPRESS OF RUSSIA.
H.R.H. THE DUKE OF CONNAUGHT.

HOOPER & CO. are also Coachbuilders to

H.M. The King of Spain.
H.M. The King of Norway.
H.M. The Queen Mother of the Netherlands
H.R.H. The Princess Royal.
H.R.H. Princess Louise, Duchess of Argyll.
H.R.H. Princess Victoria.

54, St. James's Street,
PICCADILLY, LONDON, S.W.1.

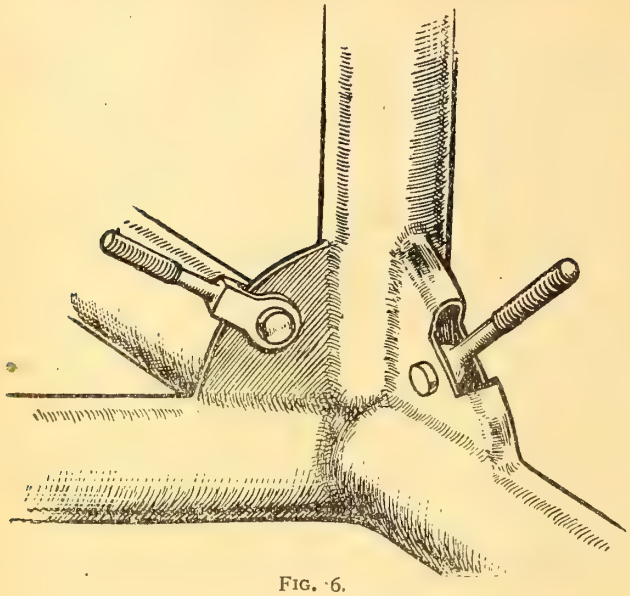


Fig. 6.

sued in the Friedrichshafen Bomber, wherein the main frame consists of three separate sections, that of the A.E.G. is in one piece from stem to stern. The longerons are 30 mms. in diameter and the transverse members 30 mms., these dimensions being retained up to the extreme tail end. The nose part of the frame is covered in with three-ply wood, but behind this a double covering of fabric is used, under which the tubular construction is completely hidden. Behind the after cockpit a single covering only is adopted and laced the whole of its length so that it is removable in its entirety.

Engine Struts.

These are of streamline steel tubing and embrace joints of a somewhat similar type to those used on the interplane struts; that is to say, a certain amount of free movement is provided. The mounting of the engines is clearly shown in the front and side elevations. In front there are four struts which converge to a joint on the leading spar, whilst at the rear there are two struts which meet at a joint on the trailing spar. The attach-

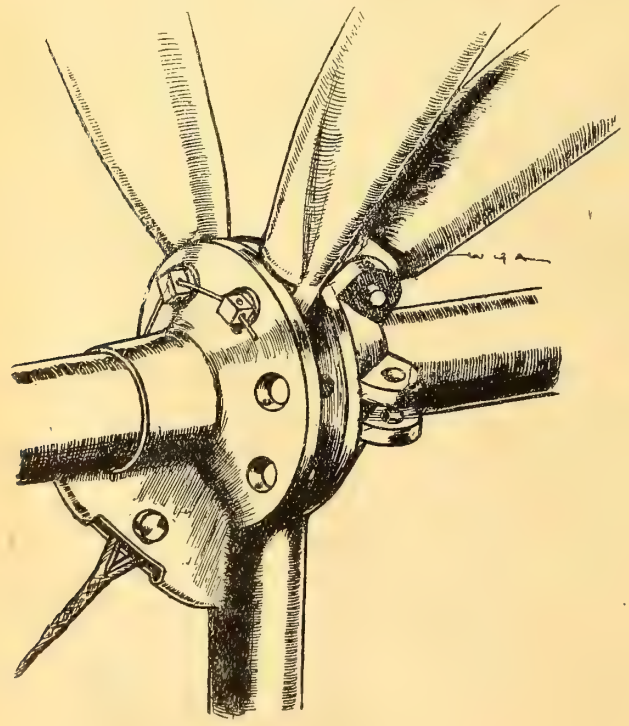


Fig. 7.

ment of the former is shown in Fig. 8. The bell-shaped housing attached to a cup on the spar joint contains a ball-ended set screw which screws into the foot of the four struts which are here united by welding. The inclined transverse struts are taken from the spars to the engine mounting and cross struts from thence again to the upper booms of the fuselage. In order to provide simplicity of erection these subsidiary struts are provided with a means of adjustment as shown in Fig. 9. At

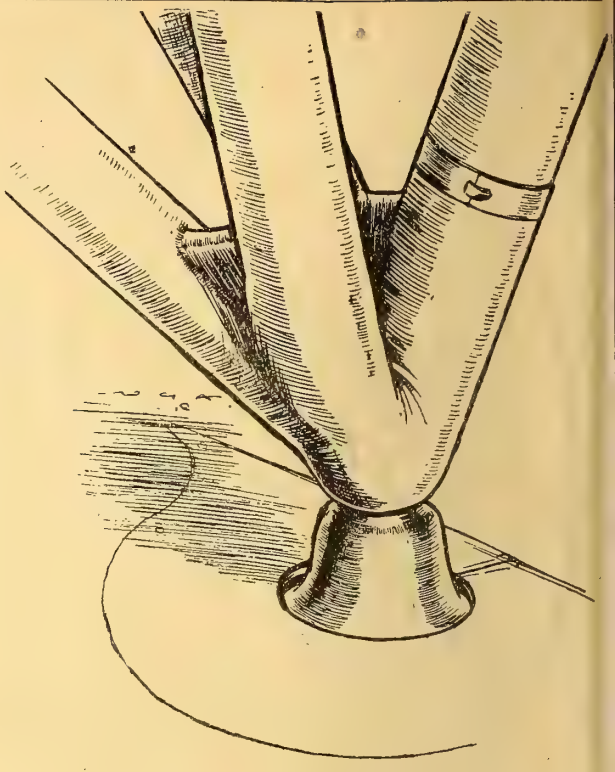


Fig. 8.

one end they terminate in a ball-ended set screw screwed into the tapered end of the strut and secured by a lock nut.

Engine Mounting.

The engine bearers are of steel rectangular section, measuring 40 mms. high by 30 mms. broad, with a wall thickness of approximately 2 mms. These bearers are welded to the struts which support them, as shown in Fig. 10, and for the greater part of their length are reinforced by a system of tubular tie-rods also welded in position. Box attachments welded to the engine bearers, as shown in Fig. 11, are provided for the crank-chamber holding-down bolts. The engine is not directly mounted on the steel bearers, but upon ½-inch wooden washers. Owing to the deformation inseparable from so much welding, the engine mounting is of very clumsy appearance, and, in fact, the quality of welding does not appear to be up to previous German standards, but the construction would appear to be light.

Engine Fairing.

As shown in the photographs, the engines are

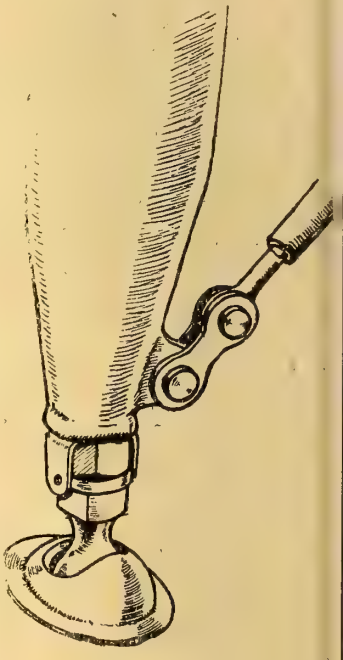


Fig. 9.

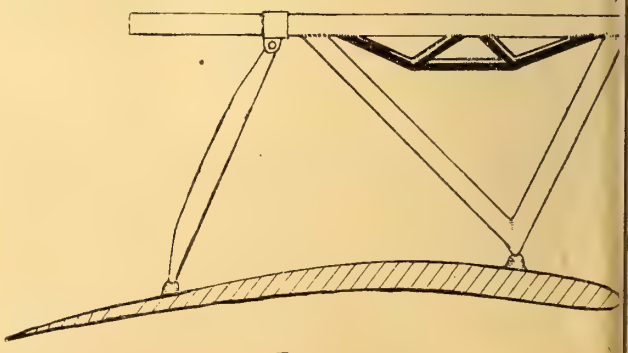


Fig. 10.

A PERFECT FINISH

is assured if you use Naylor's Superfine Products.

Write for Booklet describing Specialities for AERO WORK.

Our qualities include :

AIRSCREW VARNISHES

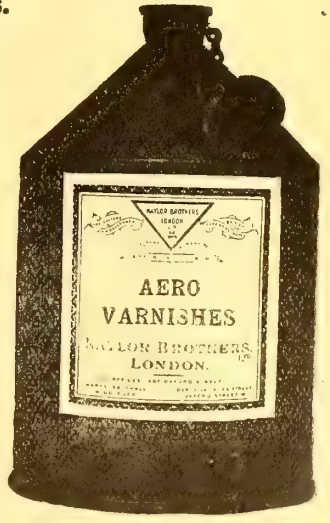
(Particulars of scheme approved by A.I.D., free on request.)

Dope-resisting White Paints and Varnishes,

Seaplane Varnishes, Etc., Etc.

And a variety of other approved Finishes.

Samples sent with pleasure.



NAYLOR BROTHERS
(LONDON) LTD.
Manufacturers of Superfine Varnishes, Paints, Enamels and Distempers,
LONDON & SOUTHALL.
Offices : 407 & 409, OXFORD ST., London, W.
Depot : 14, JAMES STREET, Oxford St., W.

TELEPHONE—926 PAD.

Established 117 Years.

Contractors to all Government Departments.

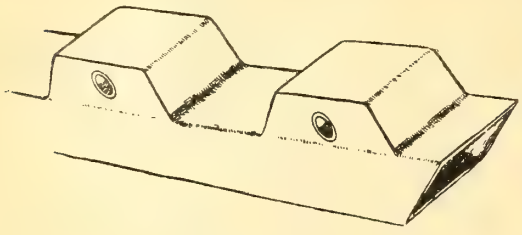


Fig. 11.

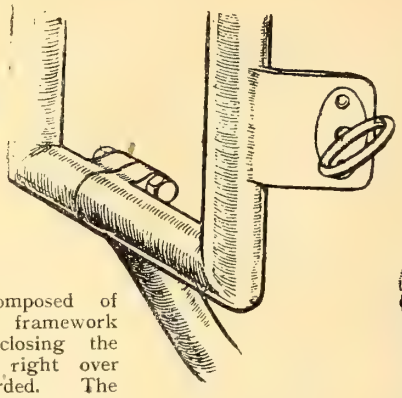


Fig. 12.

almost completely enclosed in a fairing composed of detachable aluminium panels. The necessary framework and clips are provided for panels totally enclosing the engine, but it would seem that this bonnet right over the heads of the cylinders has been discarded. The tubular framework which supports the panels is an elaborate piece of work comprising a multiplicity of welded joints. It consists of 16 mm. tubes, to which are attached lugs for carrying the necessary turn-buttons. The framework is made in two halves so as to be easily detachable, and a joint for that purpose is made, as shown in the sketch Fig. 12. It will be noticed that a narrow slot for the exit of air passing over the engine is provided at the rear end of the engine egg, an opening of somewhat similar dimensions being between the two halves of the radiator.

Engines.

The engines are the standard 6-cylinder 260-h.p. Mercédès. These engines have already been fully described, and no important novel points are adopted. A new shape has been adopted for the exhaust pipe, and this is clearly shown in one of the photographs—an inverted cone is placed in the belled mouth of the pipe. The usual water-pump greaser is fitted and worked by a lever in the pilot's cockpit. It is of rather less clumsy design than that of the Friedrichshafen, but employs the same principle. The throttle is interconnected with the ignition advance as described in the Friedrichshafen report. A small fitting, the purpose of which is not very clear, is attached to the carburetter, and consists, as shown in Fig. 13, of a bell-shaped cover over the top of the float chamber, not directly connected thereto, but supported on a bracket clipped to the main water pipe. The bell is free to slide up and down the stem of the bracket, on which it is a very loose fit, but is prevented from falling over the float chamber by a small washer. It is conjectured that this fitting may have for its purpose the prevention of petrol having access to the hot exhaust pipe in the event of the machine turning over. Between the bell and the float chamber is a clearance of about $\frac{1}{4}$-inch.

Petrol System.

The petrol system employed on the A.E.G. is as set out diagrammatically in Fig. 14. There are two main tanks, each of 270 litres = 95 gallons total capacity, and these are placed under the pilot's seat in the main cockpit. Two subsidiary tanks used solely for starting purposes and giving a gravity supply are mounted in the centre section of the top main plane and are roughly streamline form. Beneath them is a small cowling containing their level gauges, which are visible from the pilot's seat. On the right hand side of the main cockpit is fitted a hand-operated wing pump, the object of which is to draw petrol from either of the main tanks and direct it to the gravity tanks. Pipes from all four tanks are taken to a distributing manifold on the dashboard, and by means of seven taps thereon the supply of petrol can be directed from any one of the tanks to either engine or both. Two additional taps are provided on the wing pump so that the fuel for the gravity supply can be drawn from either main tank as required. The photograph (H) clearly shows the arrangement of the petrol taps, which are of the plain plug type. It would appear that the troubles associated with this form of tap have been overcome, as they

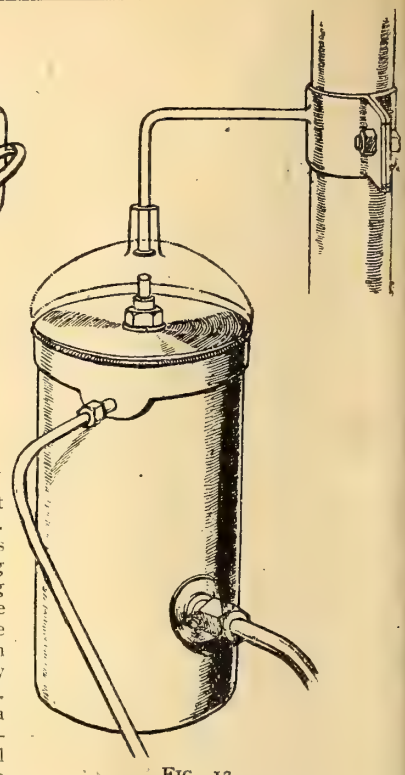


Fig. 13.

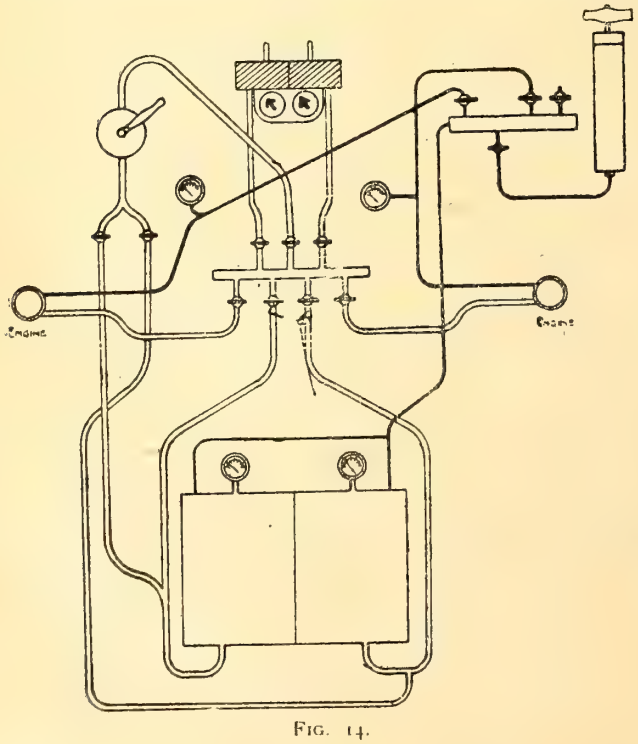


Fig. 14.

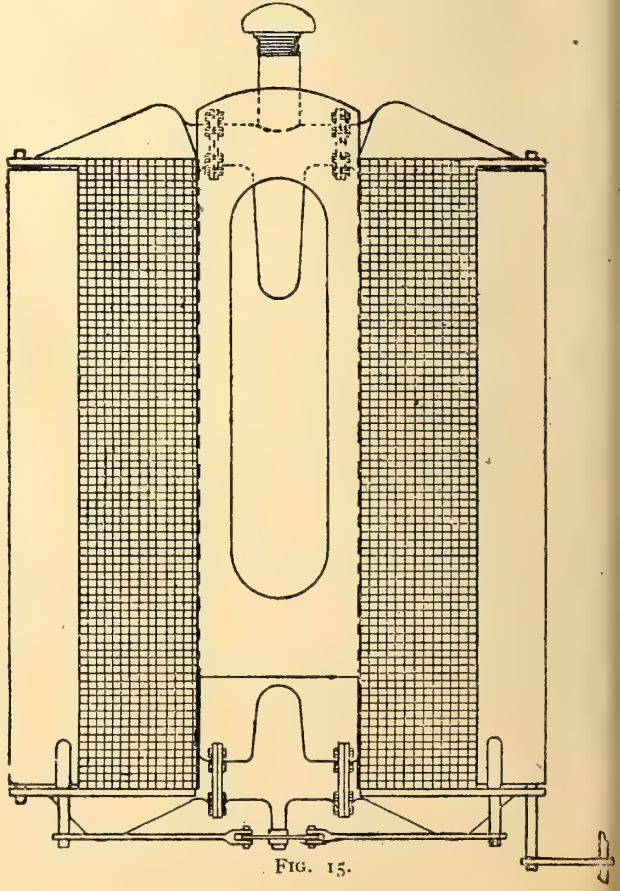


Fig. 15.

CELLON

(NON-POISONOUS)

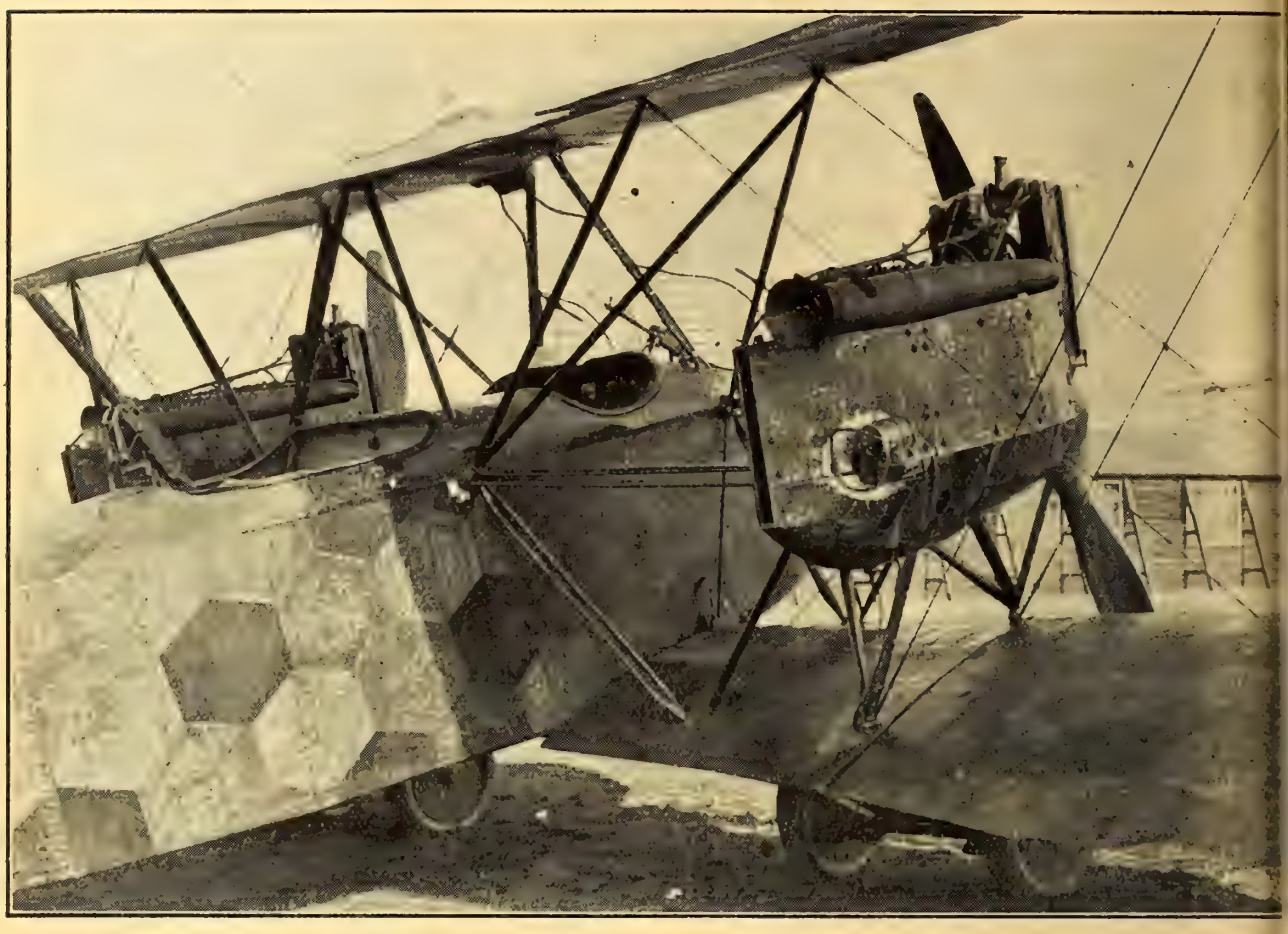
DOPE

CELLON LTD.,

22, CORK STREET, LONDON, W.1.

Telephone—GERRARD 440 (2 lines). Telegrams—"AJAWB, REG, LONDON."

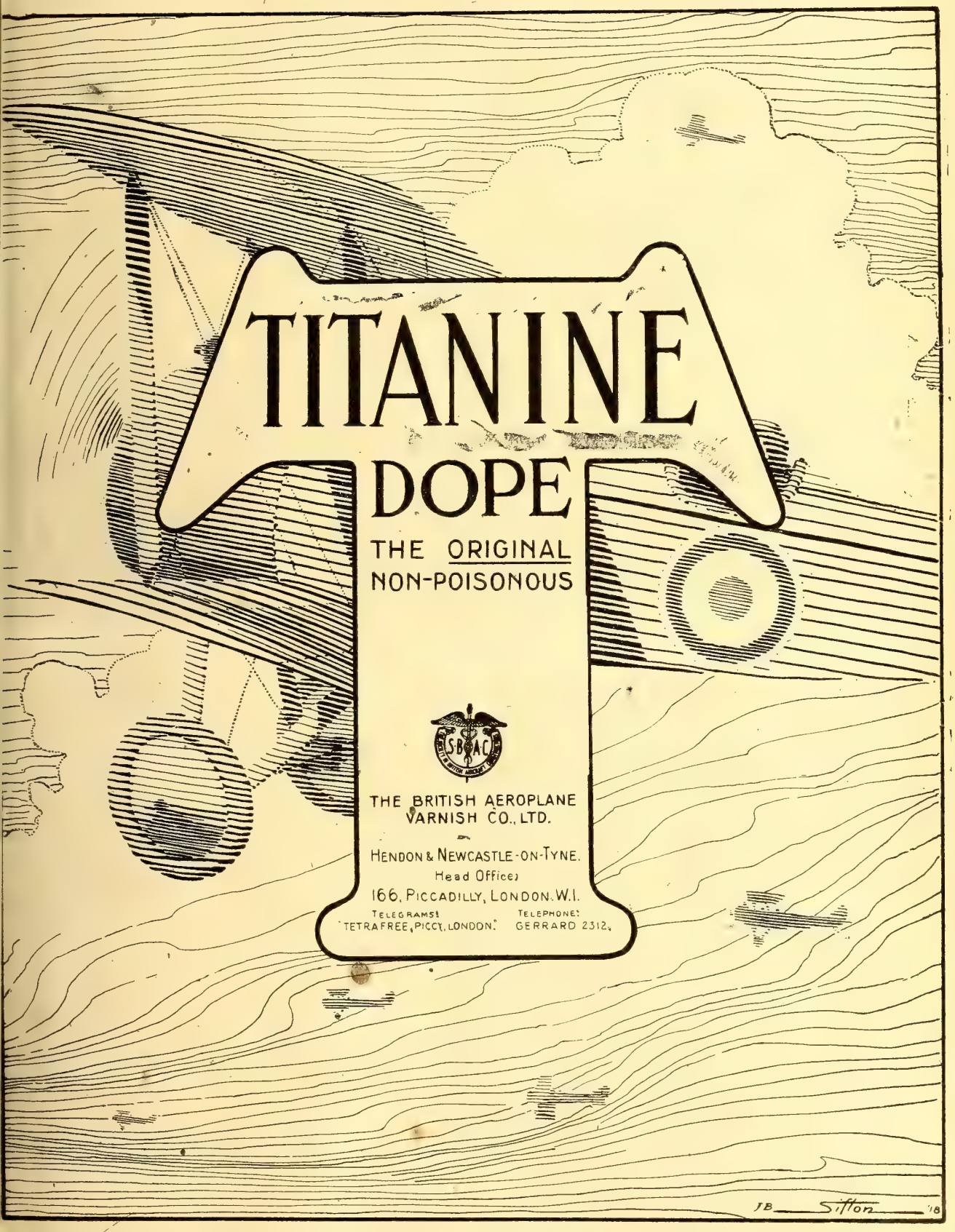
Contractors to H.M. Government



(E) Three-quarter Rear View of Starboard Power-egg.



(F) Three-quarter Front View of Starboard Power-egg.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON, W.1.
TELEGRAMS: "TETRAFREE, PICCY, LONDON."
TELEPHONE: GERRARD 2312.
JB Sifton '18

H. & O., Ltd.

Harris & Others, Limited,

AIRCRAFT CONSTRUCTORS,

Old Town, Clapham, S.W.4.

Phone: "Battersea {1238 1047

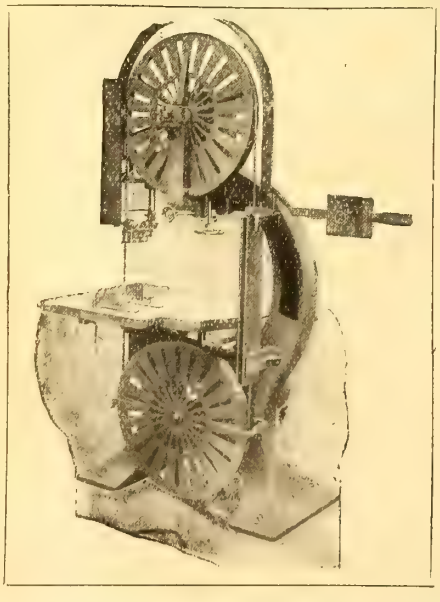
WOODWORK, METALS, COVERING AND DOPING.

Sub-Contractors to leading Aeroplane Builders.
On Admiralty and War Office Lists.

HAIGHS

(OLDHAM) LIMITED

MANUFACTURERS OF ALL TYPES OF WOODWORKING MACHINERY.



C.K.S. Type High Speed

Band Sawing Machine

BUILT IN THREE SIZES WITH SAW PULLEYS.

26 inches, 30 inches, and 36 inches diameter.

OLDHAM.

Telegrams: HAIGH, OLDHAM.
Telephone: 1273 Oldham.

Haighs (OLDHAM) LTD.

SELSDON

AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W.1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO, CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DEH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.

Contractors to the Admiralty and Air Board.

THE

CENTRAL AIRCRAFT COMPANY

DESIGNERS AND CONSTRUCTORS OF AIRCRAFT.

Office

KILBURN, N.W.6.

Telegrams: Aviduction, Phone, London.
Telephone: Hampstead 4403, 4404.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

WE CAN DELIVER—

A·G·S· Shackles

SIZES- (158) -A, B & C.

In any Quantities

AT ONCE.

THE ACTUAL MANUFACTURERS

THE BRITISH GOLD SHELL RING CO., LTD.,

HOUNSLOW, MIDDLESEX.

Telephone; HOUNSLOW 254.

Telegrams, GOLSHEL - HOUNSLOW.

HANDLEY PAGE LTD.

CONTRACTORS TO THE ADMIRALTY AND WAR OFFICE

CRICKLEWOOD, LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines).

"HYDROPHID, CRICKLE," LONDON

Contractors to H.M. Admiralty, War Office and Foreign Governments.

The BRITISH CAUDRON

CO., LTD.

SOLE BUILDING AND SELLING RIGHTS FOR

Caudron Aeroplanes and Hydro-Aeroplanes

FOR

THE BRITISH EMPIRE AND DEPENDENCIES

Head Office:

BROADWAY, CRICKLEWOOD, N.W.2.

Cable and Telegraphic Address: "CAUDROPLAN, CRICKLE, LONDON." Phone: 46 7 / 4648 HAMPSTEAD.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

ACCLES & POLLOCK, LIMITED.

MANUFACTURERS OF STEEL TUBING & PRESSWORK PARTS.

The Firm with the largest Aircraft experience in Tubular Components and Steel Presswork. Send us details of your requirements.

OLDBURY, BIRMINGHAM.

TELEGRAMS: "ACCLES, OLDBURY."
CODE: A.B.C., 5TH EDITION.
TELEPHONE: OLDBURY 111 (4 LINES).

Trade Mark. ANKH *Means Long Life.*

MEERLOO

WE can accept your orders for immediate deliveries in any quantities of

Description.	Size	A.G.S. No.
Nuts	4BA	115C
"	2BA	115B
"	6BA	115D
"	4BA (LH)	238C
"	2BA (LH)	238B
"	6BA (LH)	238D
"	¼ BSF	116A
"	9/32 BSF	116B
"	5/16 BSF	116C
"	11/32 BSF	116D
"	⅜ BSF	116E
"	¼ BSF	239A

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

A.G.S. PARTS

We have the most modern plant in London engaged on the day and night production of A.G.S. Parts. We are equipped to fill your needs in the quickest possible time. Let us know your requirements.

'Phone: REGENT 1394.

Wires: "AEROMEECOL, PHONE, LONDON."

THE MEERLOO ENGINEERING CO LTD.

CONTRACTORS TO THE AIR BOARD.

Head Office:
199, PICCADILLY, LONDON, W.1.

JOHN MEERLOO, Junr., Managing Director.



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London." Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London." Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1992 (3 lines)

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1170.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 612.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Martinsyde Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis. London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester. City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193.

Short Bros, Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston." Kingston 1088 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London. Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Yeovil. "Aircraft, Yeovil." Yeovil 120.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1865.

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton. Wimbledon 1314.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand and Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London." Avenue 993, 996, and 7066.

Buildings—

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, London." Phone. City 2681-2

Cable Coverings and Cable Controls—

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61.

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico, London, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberrys, Ltd., Haymarket S.W.1 Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6.

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (4 lines)

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.

The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg. London." Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8926.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 685.

The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevenfold, London." Walthamstow 408 (2 lines).

Electrical Accessories—

Belling & Co., Montague Road, Uppermonton, N.18. "Belling, Edmo Tottenham

Johnson & Phillips, Ltd., Charlton, L S.E.7. "Juno, London." Central 2207, London Wal

Mann, Egerton & Co., Ltd., 177, Che Street, London, W.1. "Installing, road, London." Museu

Premier Electric Heaters, Ltd., 258, 25 360, Bradford Street, Birmingham. renheit, Birmingham." Midlan

The Rotax Motor Accessories Co., Ltd. toria Road, Willesden Junction, N "Rodynalite, Phone, London." Willesden

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, try." Coventr

Johnson & Phillips, Ltd., Charlton, L S.E.7. "Juno, London." Central 2207, London Wal

Electric Lighting and Pow

E. Stanley Fardon, A.M.I.E.E., 67, Street, Manchester

Johnson & Phillips, Ltd., Charlton, L S.E.7. "Juno, London." Central 2207, London Wal

Electro Platers and M Polishers' Engineers—

W. Canning & Co., 133-137, Great H Street, Birmingham. "Materials mingham. Birmingham 3622 Central (3

Enamel—

Silico Enamel Co., New Cross, Londo

Flare Lights—

Imperial Light, Ltd., 123, Victoria Stree don, S.W.1. "Edibrac, 'Phone, Lo 3540 Victoria (3

Flexible Shafts—

Herbert Terry & Sons, Ltd., R "Springs, Redditch." Reddi

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbo lage, Bournemouth. "Etches, Wint Bournemouth

Cambridge School of Flying and Aerodro 308, St. Andrews St., Cambridge. bon, Cambridge." Cambridge 5 an

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pa House, London, E.C.2. London Wall 573 an

Galvanising—

Boulton & Paul, Ltd., Rose Lane, N "Aviation, Norwich." Norwi

Gauges—

J. A. Prestwich & Co., Northumberlanc Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Birmingham. "Mosgear, Birmingh E

Glue—

Cannon, B., & Co., Ltd., Lincoln. Office, 110, Cannon Street, "Bececolin, Cannon, London." Ci

Improved Liquid Glues Co., Ltd., Gt. tage Street, E. (Croid.). "Ex Wapp, London." Avenu

Mendine Co., 8, Arthur Street, E.C. Bar

Oldroyd, Wm., & Sons, Ltd., 9, Mincing

Goggles—

Triplex Safety Glass Co., Ltd., 1, All Street, Piccadilly, W.1. "Shatterlys London." Rege

Hack Saw Blades Machines—

Victor Saw Works, Ltd., 2 and 3 Street, Finsbury Circus, London Vicsaw, Phone, London." London Wa

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 Southwark Street, London, S.E.1. London." Hop 372 (2

Sturtevant Engineering Co., Ltd., 147, Victoria Street, London, E.C.4. tevant, London." Central 7121 (

Hollow Spars—

McGruer Bentwood Hollow Spar Co. mercial Wharf, Lambeth, S.E. son, Watloo, London." H

Robert Young's Construction Co., Ltd., bury Street, Essex Road, London,

Instruments—

British Wright Co., Ltd., 33, Chancer W.C.2. Holbor

Buyers' Guide.



uments (Scientific, Alti-eters, etc.)—

Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 642.

t & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

neto Driving Pieces—

bert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61

netos—

M-L Magneto Syndicate, Ltd., Coventry. "Corlton, Coventry." Coventry 1008-1009.

British Lighting & Ignition Co., Ltd., 204, Tottenham Court Road, W.1. "Vicks mag. Phone, London." Museum 430

British Thomson-Houston Co., Ltd., Lower Ford Street, Coventry. "Asteroidal, Coventry." Coventry 278.

il Manufacturers—

ford, Chas., & Sons, Ltd., Birmingham "Clifford, Birmingham." Central 42-43

ils in General— Avenue 1432

hrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

t & Co., 46, Fencharch Street, London, E.C.3. "Poetry, Fen, London." Avenue 005, 006, and 7006

uel Mercer & Co., 198, Upper Thames Street, E.C.4. "Reconciled, Cannon, London." City 6342.

il Parts and Fittings—

les & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines)

roplane General Sundries, Ltd., Fulwood House, Fulwood Place, High Holborn, W.C. "Zeppiskout, Holborn, London." Holborn 4959.

craft Supplies Co., Ltd., Ascot House, 125, Long Acre, W.C.2 Upcast, Rand, London." Gerrard 276 (2 lines)

nott & Harrison, Ltd., Hythe Road, Willesden Junction. Willesden 2207

yliss, Jones & Bayliss, Ltd., Wolverhampton. (Bolts and Nuts.) "Bayliss, Wolverhampton." Wolverhampton 1041.

ckburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

tish Metal (Kingston), Ltd., Kingston-on Thames

thrie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

mbard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

nn, Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston, London." Museum 70.

ountford, Fredk., Lt., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261.

obertson, J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3906.

bery, Owen, & Co., Darlaston South Staffs.

nkey, Joseph, & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.

ne Pulvo Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.

he Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

he Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

homson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

Vooler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

tal Shearing Tools—

Montgomery, Smith & Co., Ltd., Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

tal Spinnings—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

tric Bolts—

Cashmore Bros., Hildreth Street, Balham, S.W. Battersea 415.

Rubery Owen & Co., Darlaston, South Staffs.

scellaneous—

Anderson, D., & Son, Ltd. (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

Bowden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

British Metal (Kingston), Ltd., Kingston-on-Thames.

Brown Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.

Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads City 3115.

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston-road, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames.

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London." London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry." Coventry 725

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 2a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London." Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9. Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." Central 291, Leeds.

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Yeovil. "Aircraft, Yeovil." Yeovil 129.

Pyrometers—

The Foster Instrument Co., Letchworth, Herts.

Foster Instruments, Letchworth, Letchworth 26.

Radiators—

Gallay Radiator Co., Ltd., 108, Great Portland Street, W.1. "Galyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London." City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—

Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs.

Sheet Metal Work—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Rubery Owen & Co., Darlaston, South Staffs.

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

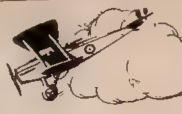
Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 1526.

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 406.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 204, Borough High Street, S.E.1. "Buc[illegible]ron, London." Hop 3811 (2 lines).

BUYERS' GUIDE cont. on next page.



The · Aeroplane Buyers' · Guide.



Acceptance and Experimental Flights—
The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London" Gerrard 278 (2 lines)

Acetylene Welding Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Vic 4630
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria (3 lines)

Aeroplane Manufacturers—
Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345 (4 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd., The Bristol Co., Filton, Bristol. "Aviation, Bristol" Bristol 3900
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2 "Caudroplan, Crickle, London" Hampstead 5353
Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4403, 4404
Davidson Aviation Co., Ltd., [illegible] W.8. Hammersmith 1992 (3 lines)
Dawson, John, & Co., Ltd., Newcastle-on-Tyne "Dependable, Newcastle-on-Tyne" Central 2004 (2 lines)
Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne" Eastbourne 1176
Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon "Volplane, Hyde, London" Kingsbury 120
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2 "Hydroplan, Crickle, London" Hampstead 7420
Hooper & Co., Ltd., 54, St. James St., Piccadilly, London, S.W. "Sociable, St. James, London" Regent 1012
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines)
Martinsyde, Ltd., Brooklands, Byfleet "Martinsyde, Weybridge" Woking 551, Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston Museum 3173
"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2 "Nieuscout, Crickle, London" Willesden 2455
Norman-Thompson Flight Co., Ltd., Bognor "Seawings, Bognor" Bognor 48
The Regent Carriage Co., Ltd., 126, 132, New King's Road, Fulham, S.W.6. "Carbodis, London" Putney 2240-2241
Roe, A. V. & Co., Ltd., Manchester. "Triplane, Manchester" City 8530-8531, Manchester
Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193
Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378
Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston." Kingston 1988 (8 lines).
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3 "Vickerlvo, Knights, London" Kensington 6810
Waring & Gillow, Ltd., Hammersmith "Warisen, Ox, London" Museum 5000
Westland Aircraft Yeovil "Aircraft Yeovil" Yeovil 120
White, J. Samuel, & Co., Ltd., East Cowes "White, East Cowes" Cowes 3
Whitehead Aircraft (1917), Ltd., Richmond, Surrey. "Whitecraft, Richmond, Surrey" Richmond 1862
Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe" High Wycombe 84

Airships—
Airships, Ltd., High Street, Merton Wimbledon 1314
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378

Aluminium Castings (Sand and Die)
Coan, R. W., 219 Goswell Road, London, E.C.1 "Krankases, Isling, London." City 3846.

Bent Timber Parts—
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 406
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)
Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds" Central 3927.

Blowpipes (Oxy-Acetylene)—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London" Vic 4630

Brass Sheets for Tipping Propellers—
Pritt & Co., 46, Fenchurch Street, London, E.C.3 "Poetry, Fen, London"

Buildings— Avenue 995, 996, and 7000
Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich" Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1113
Rubery, Owen & Co., Darlaston, South Staffs
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2 "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Carburettors—
Hobson, H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4670

Casein—
Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3 "Surico, Lon. Fen London." Avenue 34 and 35

Celluloid (Non-Flam.)—
Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 1306-7

Clothing—
Burberrys, Ltd., Haymarket, S.W.1 Regent 2165
Dunhill's, Ltd., Euston Road, N.W.1 "Dunseal, London" North 3105 6

Coloured Rags—
Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London" Hop 83, 301, 4272.

Component Parts—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4403, and 4404
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond." Richmond 1681
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England "Thompson Bros. Bilston" Bilston 10

Cords, Tapes, and Threads—
MacLennan, L., & Co., 30, Newgate Street, E.C.1 And at Glasgow. City 3115

Dopes—
British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard 2312
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellatate, London" Regent 4046
The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London" Gerrard 280
Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg. London." Gerrard 440.
Clark, Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2 "Pearline, Westrand, London." Regent 3923

Engines and Parts—
Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282.
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2 Hampstead 3000
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1. "Aeroflight, Vic, London" Vic 7026.
Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge" Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham Richmond 1203
Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith" Hammersmith 1010
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London" Gerrard 8026.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolhead, London." Gerrard 1654 5-6.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 985
The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W. "Elevenfold, London" Walthamstow 408 (2 lines).

Electrical Accessories—
Bellis, A. [illegible] Co., Montague Road, [illegible]
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London" Central 2207, London
Mann, Egerton & Co., Ltd., [illegible] Street, London, W. [illegible] road, London
Premier Electric Heaters, Ltd., 360, Bradford Street, Birmingham, [illegible]
The Rotax Motor Accessories Co., Ltd., Rotax Road, Willesden Junction, "R[illegible]" 'Phone, London

Electric Cables—
E. Kalker & Co., Coventry "K[illegible]"
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London" [illegible]

Electric Lighting and Power—
E. Stoakes, Ltd., [illegible]
Johnson & Phillips, Ltd., Charlton, S.E.7 "Juno, London" [illegible]

Electro Platers and Metal Polishers' Engineers
W. Canning & Co., 133-135, Great Hampton Street, Birmingham. "[illegible]" Birmingham 362 Central

Enamel
Silico Enamel Co., New Cross, London

Flare Lights—
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London" 3540 Victoria

Flexible Shafts—
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch"

Flying Schools—
Bournemouth Aviation Co., Ltd., [illegible] Bournemouth "[illegible]"
Cambridge School of Flying, [illegible] 308, St. Andrews St., Cambridge. "Cambridge" [illegible]

Furniture (Office)—
Cooke's (Finsbury), Ltd., Finsbury House, London, E.C. London Wall 5[illegible]

Galvanising—
Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich"

Gauges—
J. A. Prestwich & Co., Northumberland Park, Tottenham, N.17.

Gears—
Moss Gear Co., Ltd., Thomas St., Birmingham "Mosgear, Birmingham"

Glue—
Cannon, B., & Co., Ltd., Lincoln Office, 110, Cannon St., "Beccocolin, Cannon, London"
Improved Liquid Glues Co., Ltd., [illegible] Street, E. (Croid) Wapp London
Menlino Co., 8, Arthur Street, E.C.
Oldroyd, Wm., & Sons, Ltd., [illegible]

Goggles—
Triplex Safety Glass Co., Ltd., [illegible] Street, Piccadilly, W.1 [illegible] London

Hack Saw Blades Machines—
Victor Saw Works, Ltd., [illegible] Street, Finsbury Circus, London "Victsaw, Phone, London" London [illegible]

Heating and Ventilating—
Chas. P. Kinnell & Co., Ltd., Southwark Street, London, S.E. "[illegible]" London
Sturtevant Engineering Co., Ltd., 147, Victoria Street, London, E.C. "Sturtevant, London." Central [illegible]

Hollow Spars—
McGruer Bentwood Hollow Spar & Commercial Wharf, Lancelot Watson, London
Robert Young's Construction Co., [illegible] Road, L[illegible]

Instruments—
British Wright Co., Ltd., 33, Queen Street, W.C.2.

Instruments (Scientific, Altimeters, etc.)—
[illegible] Scientific Instrument Co., Ltd., [illegible] "Instrument, Cambridge" Cambridge 642.
[illegible] Mason, Ltd., Maidenhead Road. "Aneroid, Phone, [illegible]" [illegible] 180

Magneto Driving Pieces—
[illegible] Ltd., Redditch "[illegible] Redditch" Redditch 61

Magnetos—
[illegible] to Sredis, Ltd., Coventry. "[illegible], Coventry" Coventry 1008-1009.
[illegible] & Ignition Co., Ltd., [illegible] Court Road, W. "Vicks" Museum 43[illegible]
[illegible] Thomson-Houston Co., Ltd., Lower [illegible] "Astroidal, Coventry" Coventry 278.

Metal Manufacturers—
[illegible] & Sons, Ltd., Birmingham Central 42-43

Metals in General— Avenue 1432
[illegible] J. B., & Son, 30, St. Mary Axe, E.C.3
[illegible] Co., Leadenhall Street, London, [illegible]
[illegible] Mercer & Co., 108, Upper Thames Street, E.C.4. "Reconciled, Cannon." City 6342

Motor Parts and Fittings—
[illegible] Ltd., Oldbury, Birmingham "[illegible]" Oldbury 111 (3 lines)
[illegible] General Sundries, Ltd., Fulwood Place, High Holborn, "[illegible]" Holborn, London" Holborn 4059
[illegible] Co., Ltd., Ascot House, 125, [illegible] W.C.2 "Upcast, Rand." Gerrard 276 (2 lines)
[illegible] Ltd., Hythe Road, Willesden Junction Willesden 2207
[illegible] Bayliss, Ltd., Wolverhampton. "Bayliss, Wolverhampton" Wolverhampton 1031
[illegible] Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345 (4 lines)
[illegible] (Kingston), Ltd., Kingston-on Thames
[illegible] J. B. & Son, 30, St. Mary Axe, E.C.3
[illegible] Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham" Midland 211 (2 lines).
[illegible] Egerton & Co., Ltd., 157, Cleveland Street, London, W.1 "Installing, Euston, London" Museum 70
[illegible] Fredk. Lt., Lifford, Birmingham. "[illegible], Birmingham" King's Norton 261.
[illegible] J. H., & Co., 1, Albemarle Street, London, W.1 Regent 3006
[illegible] Owen & Co., Darlaston, South Staffs
[illegible] Joseph, & Sons, Ltd., Wellington, Shropshire "Sankey, Wellington, Salop." Wellington 17
[illegible] Engineering Co., Ltd., 10 to 16, Dane Street, High Holborn, London, W.C.1. "[illegible], 'Phone, London" Holborn 410
[illegible] Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selsero, Phone, London" Regent 1181.
[illegible] Motor Accessories Co., Ltd., Rotax Road, Willesden Junction, N.W.10 "Rotaxmo, 'Phone, London" Willesden 2480.
[illegible] Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston" Bilston 10
[illegible] Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—
[illegible] Smith & Co., Ltd., Keynsham, Bristol "Ingenuity, Saltford" Keynsham 21

Metal Spinnings—
[illegible] Sons, Lawrence Road, Tottenham,

Metric Bolts—
[illegible] Bros., Hildreth Street, Balham. Battersea 415.
[illegible] Owen & Co., Darlaston, South Staffs

Miscellaneous—
[illegible] D. & Son, Ltd. (Roofs), Belfast "Anderson, Belfast" Belfast 4033-4034-4035.
[illegible] Wire, Ltd., Willesden Junction. [illegible] Harles, London" Willesden 2400 (3 lines)
[illegible] Metal (Kingston), Ltd., Kingston-on-Thames
[illegible] Bros., Ltd., Great Eastern Street, "Imbrowned, Bethread, London" London Wall 6300
[illegible] Food Co., Ltd., Chapel-en-le-Frith, [illegible], Birmingham" Central 793.
[illegible] J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and [illegible] City 3115

Motor Cars—
Arrol-Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282
Mann, Egerton & Co., Ltd., 378-380, Euston Road, London, N.W.1 "Manegcar, Euston-road, London" Museum 70
Standard Motor Car Co., Coventry "Flywheel, Coventry" Coventry 530 (4 lines)

Nameplates and Labels—
British Metal, Kingston, L.T., Kingston-on-Thames
The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing"

Observation Panels—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London" Regent 1342

Parachutes—
E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemanso, Ave, London" London Wall 3206-3207

Pattern Making—
Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd. 4743

Piston Rings—
British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry [illegible]
The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield "Ocean, Sheffield" Sheffield 2140

Plating, Nickel Silver and Electro Tinning—
Arnold & Sons, Lawrence Road, Tottenham, N.15

Power Presses and Dies—
Bliss, E. W., & Co., 25, Pocock Street, Blackfriars Road, London, S.E.1 "Blissdon, London" Hop 434

Presswork—
Rubery, Owen & Co., Darlaston, South Staffs
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Propellers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (4 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich" Norwich 851.
Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Ebora, Kingston" Kingston 672
Integral Propeller Co., Ltd., "Weprop, Hyde, London." Hendon 19, Kingsbury 104
Lang Propeller, Ltd., Weybridge "Aerosticks, Weybridge" Weybridge 520-521
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines)
Oddy, W. D., & Co., Leeds "Airscrews, Leeds" Central 291, Leeds
Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347
Westland Aircraft Yeovil "Aircraft, Yeovil." Yeovil 120

Pyrometers—
The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth Letchworth 21

Radiators—
Gallay Radiator Co., Ltd., 108, Great Portland Street, W.1 "Galvradico, Wesdo, London" Mayfair 4826

Rigging for Aircraft—
Cradock, Geo. & Co., Ltd., Wakefield Fineland "Cradock, Wakefield" Wakefield 466

Rubber Tubing & Accessories
Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1 "Masticator, Isling, London" City 3811 and 3812

Safety Belts—
Holmes, C. H., & Son, 38 Albert Street, Manchester "Scratch Manchester" City 4432.

Screw-driving Machines—
Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345 (4 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 237
Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines).
The Norman Thompson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 48
Short Bros., Rochester. "Seaplanes Rochester" Chatham 627
Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—
Bowser, E., 50, Park Lane, Leeds Central 3473.

Searchlights and Landing Lights
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibrac, 'Phone, London" 3540 Victoria (3 lines).
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxmo, 'Phone, London" Willesden 2480

Shackles—
British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Goldshell, Hounslow" Hounslow 254
The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxmo, 'Phone, London" Willesden 2480

Sheet Metal Pressings—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Arnold & Sons, Lawrence Road, Tottenham, N.15
Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345
W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham "Brisk, Birm" Central 550
British Metal (Kingston), Ltd., Kingston-on-Thames
London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham East 497 Birmingham
Rubery Owen & Co., Darlaston, South Staffs

Sheet Metal Work—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4630
Arnold & Sons, Lawrence Road, Tottenham, N.15
British Metal (Kingston), Ltd., Kingston-on-Thames
Rubery Owen & Co., Darlaston, South Staffs
The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London" Vic 4630
The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selsero, Phone, London" Regent 1181
Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1143.

Small Tools—
The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Protool, West-Cent, London" Museum 1955

Sparking Plugs—
Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 155
Ripault, Leo & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1 "Ripault, Reg. London" Gerrard 7758.

Springs—
Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 321.
Terry, Herbert, & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61 (3 lines)

Stampings— Avenue 1432
Guthrie, J. B., & Son, 30 St. Mary Axe, E.C.3
Arnold & Sons, Lawrence Road, Tottenham, N.15

Steel—
Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield" Sheffield 4607.
Firth, Thos., & Sons, Sheffield "Firth, Sheffield" Sheffield 3230 to 3237
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3 Avenue 1432
Sicklin, Bernard, & Co., Birmingham "Bernico, Birmingham" Smethwick 224

Steel Stamps and Markings—
John Moorlow & Sons, Cleveland Street, Mile End, E.1. "Davhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—
Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Taper Pins—
Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham" King's Norton 261-262.

Tapes and Smallwares—
MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow City 3115

Timber—
Brown, R. F. & F. W., Wollaton, near Nottingham Nottingham 1576.
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London" Museum 406
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough" Market Harborough 13.
J. Owen & Sons, Ltd., [illegible], Borough High Street, S.E.1. "Buc[illegible]eron, London" Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord.Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emailite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London" Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers—
Guthrie, J. B. & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs—
Arnold & Sons, Lawrence Road, Tottenham, N.15.
Barimar, Ltd., 10, Poland Street, W.1. "Bariquamar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5910.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh." Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdale. "Robinson, Rochdale." Rochdale 467.
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

By Royal Warrant of Appointment. **ESTABLISHED 1819.**

ARNOLD & SONS,

Engineers and Instrument Manufacturers,

Sheet Metal Work, Sheet Metal Pressing, Stamping, Spinning, Acetylene Welding, Nickel Plating, Silver Plating, Electro Tinning, etc., etc.

LAWRENCE ROAD, TOTTENHAM, N.15.
Head Office: GILTSPUR STREET, E.C.1.

Telegraphic Address:—"Instruments," London. Telephone Nos.:—City Office: 5240, 5241, 5242 City. Factory: 2370 & 2371 Tottenham.

WARING & GILLOW LTD

Furnishers & Decorators to H.M. the King

CONTRACTORS TO THE WAR OFFICE AND ADMIRALTY.

LIVERPOOL HAMMERSMITH LANCASTER

SBAC — The Society of British Aircraft Constructors

HEAD OFFICE
OXFORD ST. W.1

TELEPHONE No.: HAMMERSMITH 1980

TELEGRAMS: "Warings Factories, Hammersmith."

ESTABLISHED 1912
CONTRACTORS TO H.M. AIR MINISTRY

THE
SUPERMARINE
AVIATION WORKS, LTD.

DESIGNERS & CONSTRUCTORS OF **FLYING BOATS.**

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. SCOTT-PAINE, Director & Gen. Manager.

Offices,—
SOUTHAMPTON, Eng.

NIEUPORT
AND
GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

HIGH-CLASS

Aluminium Castings

FOR ALL TRADES.

We specialise in Aluminium Cylinders and General Aero and Motor Engine Castings.

Cast Iron Cylinders

(ONLY)

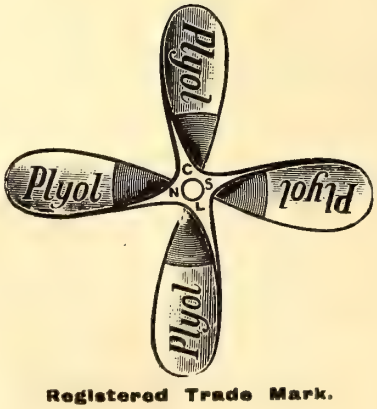
Water and Air-Cooled for Aero and Motor Engines.

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,
ALUMINIUM AND IRON FOUNDERS

GROVE STREET,
BIRMINGHAM.

"PLYOL"
THE
BEST CEMENT
FOR
THREE-PLY,
Veneering, etc.



Registered Trade Mark.

ALDGATE CASEIN WORKS.

NIEUWHOF, SURIE & Co., Ltd.
HEAD OFFICE
5, Lloyds Avenue, London, E.C. 3.

And at
ALDGATE AVENUE. ALDGATE, E.C.

Also Casein especially adapted for Waterproof Paints, Varnish, etc.

Telephones
AVENUE 34, 35.

Telegrams:
"SURICODON, FEN LONDON."



Telephones—Dalston 872. London Wall 9766. Hampstead 4768. Hornsey 1105. Cardiff 2043.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE SAW MILL PLANTS,
—— FOUR OTHER FACTORIES, ——
AND TWO YEARS' EXPERIENCE.

Postal Address only:

141, CURTAIN ROAD, E.C. 2.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
Capacity: 2 pints of glue.
Loading: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
Weight: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.13



Contract Work

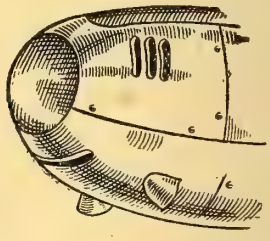
CONTRACT WANTED FOR AERO SHEET METAL WORK.

IF you are in need of quick deliveries of Sheet Metal Parts, please write at once.

We are in a position to turn out without delay

Cowls, Tanks,
Undershields, Fairings,
Panel Work of every kind.

Our present Contracts do not take up the entire output of our Sheet Metal Department, so we are in a position to handle business without delay.



Please address your reply to Mr. C.W. BRETT,

BARIMAR Ltd.

SHEET METAL DEPT.,
10, POLAND STREET,
LONDON, W.1.

Telegrams: Bariquamar 'Reg. London.
Telephone: Gerrard 8173.

PULVO

Delivered up to Contract Time

—the Ideal for which you are always striving

How often has it happened that you have failed in your endeavours to achieve the end, not from any fault of your own, but because one of your sub-contractors has let you down.

GO TO THE FIRM THAT DOESN'T LET YOU DOWN

The Pulvo Company never makes a Promise that it is not certain it can perform.

WHAT WE SAY WE WILL DO WE DO.

The PULVO ENGINEERING Co. Ltd.

Postal Address—10, DANE STREET, LONDON, W.C.1.

Telephone: Holborn 410.

Telegrams: Pulvipult, West-Cent.

Contractors to H.M. Government.

Rotax

Makers of Aeroplane Fittings

Electric Equipment for Heating and Lighting.

Streamline Wires and Fittings.

Prompt Deliveries.

AERO WIND SHIELDS.

"Labyrinth" Relief Valves, Oil and Petrol Fillers, Pressure Pumps, Petrol Filters, Taps and Brass & G.M. Fittings generally.

Water Joint Clips, Turnbuttons, Shackles, and Small Parts.

Prices and Particulars on receipt of Enquiries.

NOTE.—We have an Illustrated Catalogue of our Aeroplane Fittings. Write us and we will send you a copy.

THE ROTAX MOTOR ACCESSORIES CO., LTD.,

WILLESDEN JUNCTION, N.W.10.

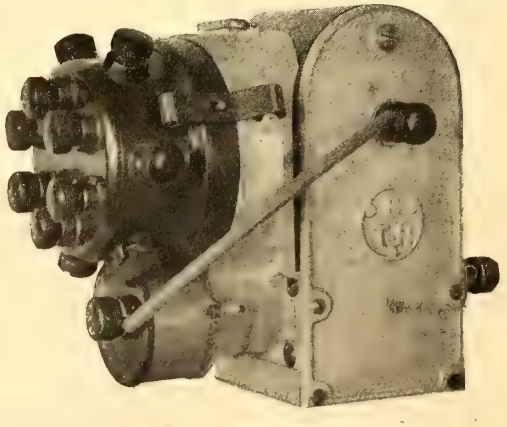
P.C.B.7.

MAGNETOS

are All-British in design and manufacture, and used wherever absolute reliability in service is essential.

The
British Thomson-Houston Co., Ltd.
Electrical Engineers and Manufacturers,
Lower Ford Street, Coventry, England.

Member of the British Ignition Apparatus Association.



B.T.H. Magneto for 12-Cylinder Engine.

ALLEN
PISTON RINGS

Best
FOR ALL MAKES AND TYPES
of
Aero Engines

An exclusive and valuable feature of the ALLEN rings is the scientific method of stressing

The whole ring is "stressed" in one simple and complete operation by a specially designed machine tool.

This means a ring of perfect accuracy and absolutely correct fit.

Judge for yourself of its superior qualities by sending for a sample ring.

ALLEN & SIMMONDS, Ltd.,
Piston and Piston Valve Engineers,
READING, Eng.

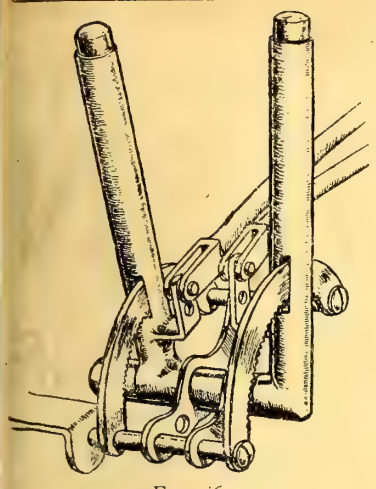


Fig. 16.

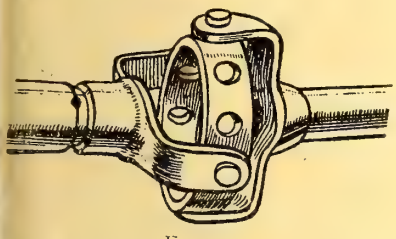


Fig. 19.

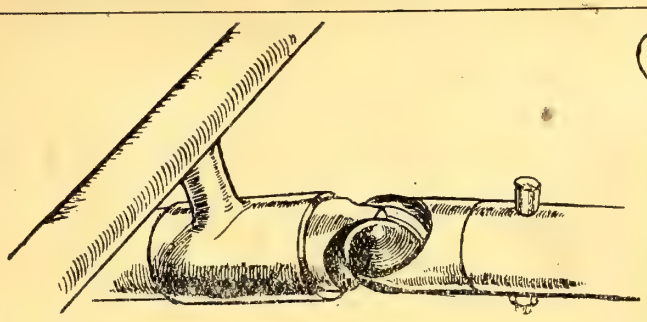


Fig. 17.

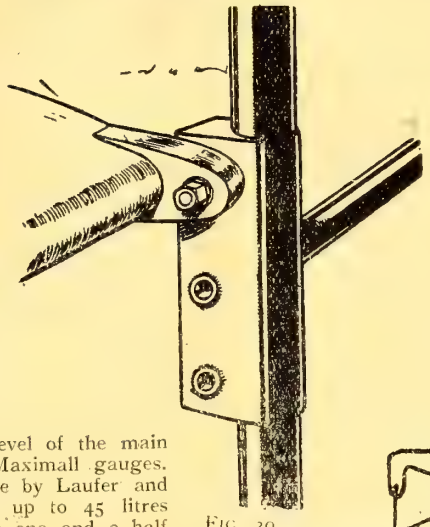


Fig. 20.

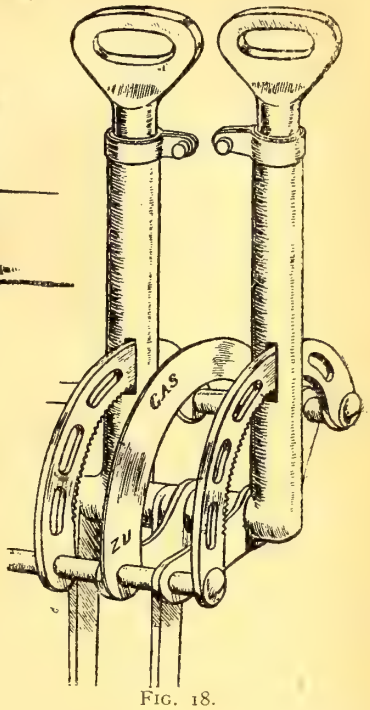


Fig. 18.

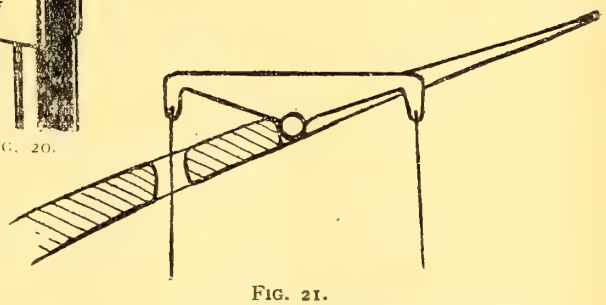


Fig. 21.

show no signs of leaking or sticking. The level of the main tanks is indicated on the dashboard by two Maximall gauges. Those attached to the gravity tanks are made by Laufer and employ the static head principle. They read up to 45 litres each, from zero to this figure being given by one and a half complete revolutions of the indicating hand.

Petrol Pressure System.

The sketch Fig. 14 also shows in solid lines the arrangement of the petrol pressure system. The usual pressure pump is mounted on each engine and pipes therefrom are led to a manifold mounted on the dashboard. This is also connected to a large hand pump on the right hand side of the pilot's seat. Gauges reading the pressure from each engine pump are provided, and there is also a blow-off tap for relieving the pressure of the whole system.

Oil System.

This is the usual system as fitted to all 260-h.p. Mercédès engines. The main supply of oil is carried in the crank-chamber sump and is continually being refreshed by a small additional supply of fresh oil drawn from an external tank. This tank has a capacity of 5 gallons, is of rectangular shape, and is mounted at the side of the engine nearest to the fuselage. It is provided with a visible glass level over which is a celluloid covered window let into the engine fairing, so that the oil level is visible from the pilot's seat.

Radiator.

Each radiator is composed of two halves bolted together, as shown in the sketch Fig. 15, which is to scale. The space between the two halves is partially covered with a sheet metal panel pierced with a hole 1ft. 6in. high by 4in. wide The radiator is not actually honeycomb, though presenting that appearance. It consists of a series of vertical tubes with transverse gills. Each radiator cell measures 2ft. 3¾in. high by 7⅝in. wide, and has a uniform depth of 4in. Each complete radiator is provided with two shutters of roughly streamline section. These, when fully closed, cover over about one-third of the radiating surface. They are controlled from the pilot's seat by two levers shown in Fig. 16, which work them through universally jointed rods. The articulation in these rods is very neat and of the form shown in sketch Fig. 17. Each radiator is fitted with an electric thermometer, full details of which device have been published. The dial of this instrument is carried on the dashboard and is furnished with a switch enabling the temperature of either radiator to be independently read.

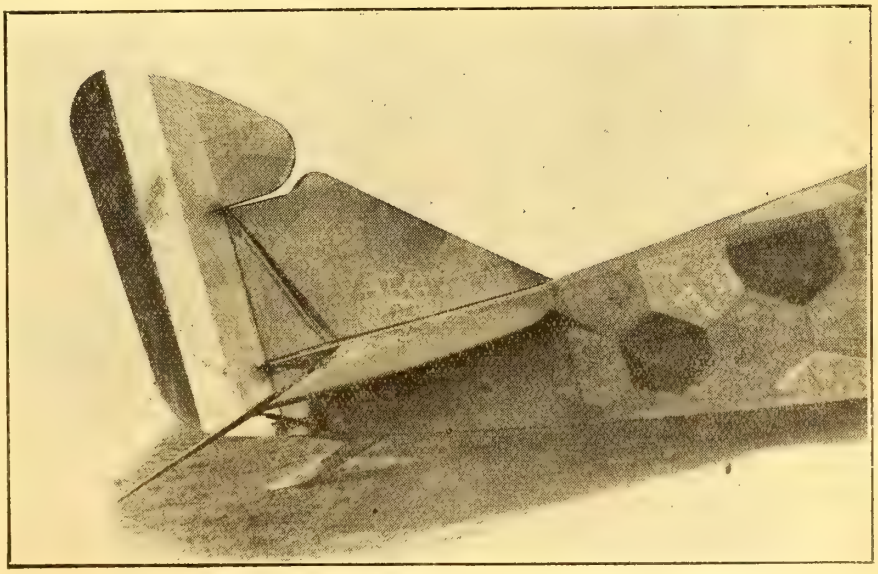
Engine Control.

The throttle levers are of the plain twin variety, and are constructed as indicated in sketch Fig. 18. They are placed close together so as to be easily worked either in unison or separately.

The connections between the levers and the carburetter are made as simple as possible, and the levers operate the throttle through a couple of universally jointed rods which extend from each side of the body to the engine eggs. The universal joints used are of the type shown in Fig. 19, there being apparently no particular desire on the part of the designer to economise weight in these details.

Tail Planes.

The fixed horizontal tail planes are notable for their extremely



(G) Near View of Rudder, Fin, and Tail-skid

bold curvature, both top and bottom. The framework consists entirely of welded steel tubing. The leading edge of the tail plane is mounted so as to be adjustable in case of necessity, a simple bracket being used for this purpose, as illustrated in Fig. 20. This is welded on to the fuselage upright at each side and strengthened with a transverse stay. It allows the tail plane leading edge to be fixed in one of three positions. The trailing edge of the tail plane is supported each side by a streamline section steel tubular strut.

Fin.

The fin, like the fixed tail plane, has also a very strongly marked streamline section at the base tapering off to flat at the top, where it abuts against the balanced portion of the rudder. At this point its framework, which is of light steel tube, is made rigid by a couple of tubular stays bracing the rudder post to the sides of the fuselage.

Rudder and Elevators.

These organs are built up of steel tubular framework and present no points of special interest, except that in the case of the rudder that part which is above the fixed fin is made of grooved section.

Ailerons.

As may be seen from the plan view of the complete machine, the shape of the ailerons is somewhat unusual. These are applied to the top plane only and have a chord which reaches its maximum at their extreme ends and its minimum in the centre of their length. For what purpose this peculiar shape is adopted is not clear. The framework of these ailerons is welded steel tubing, and the control crank is fitted in such a way as to lie partially hidden in a slot in the main plane. This crank is built up of welded sheet steel, and is arranged as shown in the sketch, Fig. 21, an elliptical hole being cut in the trailing edge of the main plane for the passage of the forward wire.

Control.

The main control consists of a wheel mounted on a pivoted lever, the wheel operating the ailerons by means of a drum and cables, which pass direct over pulleys and along tubes running parallel with the wing spars and then over inclined pulleys up to aileron cranks. The wheel column is pivoted to a long crossbar extending the whole length of the fuselage and carrying at each end cranks for the elevator control wires which at intervals are carried through fibre guides socketed to the frame. The cranks of the elevators are concealed inside the rear end of the fuselage whilst those of the rudder (which is fitted with duplicate cranks and wires) are external. A modified dual control is fitted, which allows the assistant pilot to work the elevator and rudder only. For this purpose a socket is mounted on the pivot bar into which can be inserted a plain steel tube which is normally carried in clips behind the pilot's back. A second rudder bar, the design of which is shown in Fig. 22, is carried under the dashboard and can readily be dropped into position into a square socket partially sunk into the floor of the cockpit and connected to the pilot's rudder bar by cranks and a link.

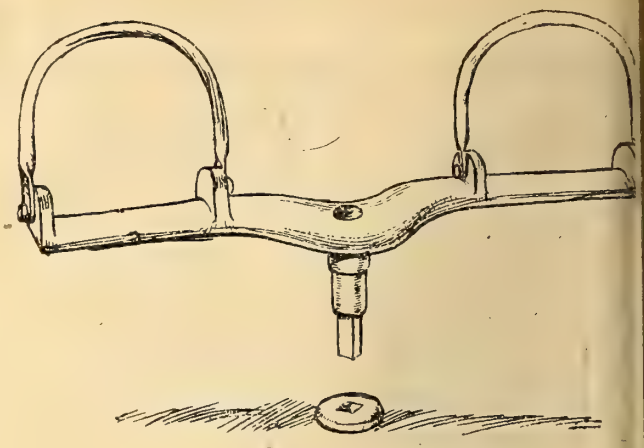
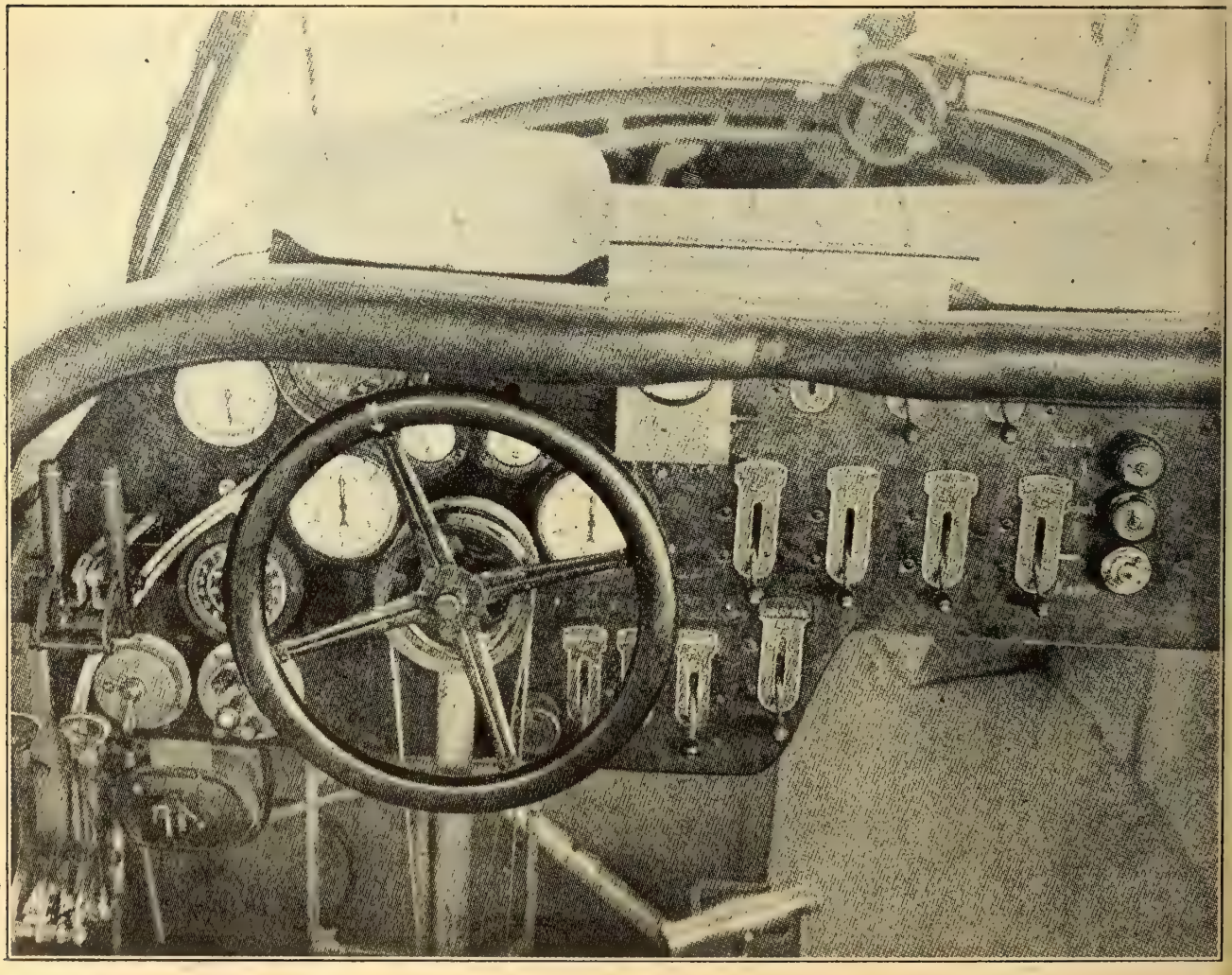


Fig. 22.



(H) The Instrument Board and Pilot's Control-wheel.

Firth's
"Speedicut" High-Speed Steel
For turning Tools.

"Speedicut" Milling Cutters
and Drills
For all workshop purposes.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6520 (4 lines).

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.

Personnel.

Seats are provided for a crew of four, who are carried as follows :—

One in the front cockpit.
One in the pilot's seat.
One at the pilot's side.
One in the rear cockpit.

All can, if necessary, change places whilst the machine is in the air. Between the front cockpit and that of the pilot a sliding panel is provided through which the gunner can crawl. The seat at the side of the pilot folds up and slides back into a cavity under the coaming of the nacelle and when in this position allows access down a narrow and inclined passage-way to the rear cockpit. The machine can hardly have been designed to satisfy the requirements of the average pilot in regard to view, as from the pilot's seat it is very difficult to see the ground properly on account of the position of the lower main plane and the width of the fuselage.

Armament.

Two Parabellum guns are mounted, one in the front cockpit and one in the rear, and provision is made for mounting a third or for transferring one of the others on the floor of the rear cockpit, so that it can fire backwards and under the tail of the machine. For this purpose a large trap door, which is visible in the photograph (K), is provided in the floor of the fuselage behind the rear cockpit. This trap door has celluloid windows and is normally kept closed by springs. It is lifted up by a small hand winch fitted with a ratchet. It is of passing interest to note that whereas in the Friedrichshafen a similar trap door was kept open by means of springs, in the A.E.G. springs are used to keep the door closed. In the front cockpit the gun is supported on a carriage which runs round a partially circular rail which is strongly supported from the fuselage by a framework of steel tubes. Forming part of this frame is an inclined steel tubular column, the base of which is fitted in a swivel bearing in the floor of the cockpit, and on this is mounted an adjustable seat for the gunner. A toothed rack runs round the rail and engages with a spur pinion driven by a hand wheel so that the gunner, when occupying his seat, swivels himself round as well as the gun. This gun mounting is shown in photograph (I), and a diagrammatic section of the carriage is given in Fig. 23. The vertical swivel of the fork-ended gun carrier is locked by a ball-ended lever and a similar lever is employed for locking the carriage itself to its rail.

This action is accomplished by a cam device which depresses the roller of the carriage and squeezes the rail section between the roller and an adjustable set screw which normally just clears the groove on the under side of the rail. In order to prevent the forward gunner from shooting the tractor screws, preventative shields of light steel tube are carried between the upper edge of the forward cockpit and the inclined struts of the centre section. These impose a limit to the travel of the gun. In the rear cockpit the gun mounting is U shaped in plan form, and here again the principle of a carriage running on a rail

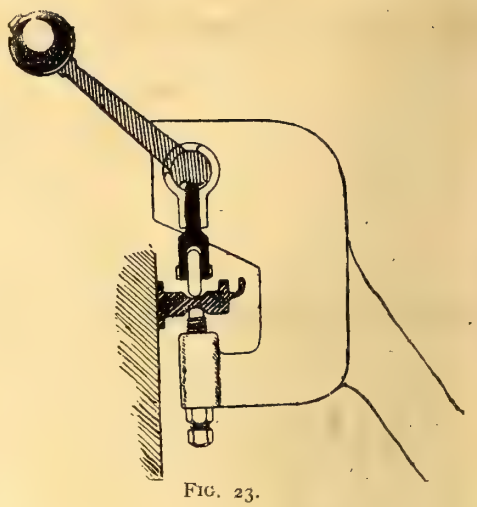
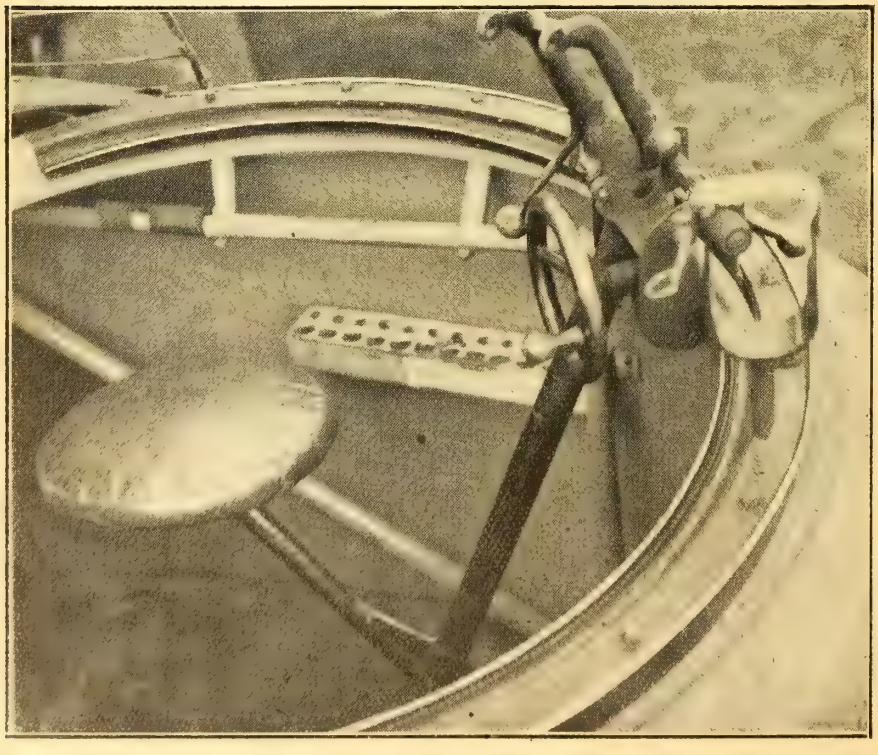


Fig. 23.

and driven by a spur gear meshing with a toothed rack is employed, though in this case the gunner's seat does not revolve with the gun. The carriage is of a somewhat similar type to that used in the front cockpit, but the method of locking it is different. This is shown diagrammatically in Fig. 24. The rail is provided with grooves both above and below, there being two rollers at the top and one underneath. Normally, when the gun carriage is free, the latter is clear of the rail, but when the locking mechanism is brought into action it is forced upwards so that the rail is gripped between the rollers, thus avoiding any possibility of shake at this point, and at the same time a positive lock is obtained on a second rail carried below the first. When the ball-ended hand lever is tightened, its effect is to squeeze the lower rail between two jaws. The movable jaw is, however, connected up by a link to a small cam, the base of which abuts against the foot of a fork-ended rod which carries the lower roller and is free to move up and down in a guide, to the base of which the cam is pivoted. By this means a very secure and rapid locking device is obtained. In the front of the rear cockpit a locker is provided which would be capable of holding ammunition, and beneath this a series of racks of the type shown in Fig 25. These racks are not strong enough to hold anything very heavy, and are placed approximately 5 inches apart.

Bombing Gear.

Three racks for holding twenty-five pounder bombs are installed on the machine; two side by side on the left side of the rear cockpit, and one on the right side of the petrol tanks in the space between the pilot's and rear cockpits. This rack is



(I) Forward Gunner's Ring and Seat.

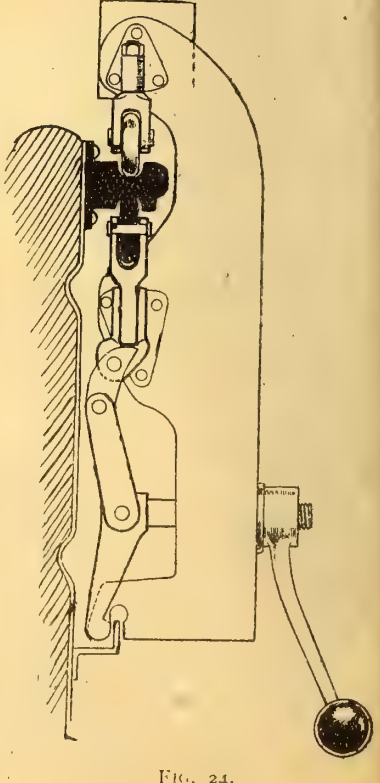


Fig. 24.



ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

GWYNNES

LIMITED.

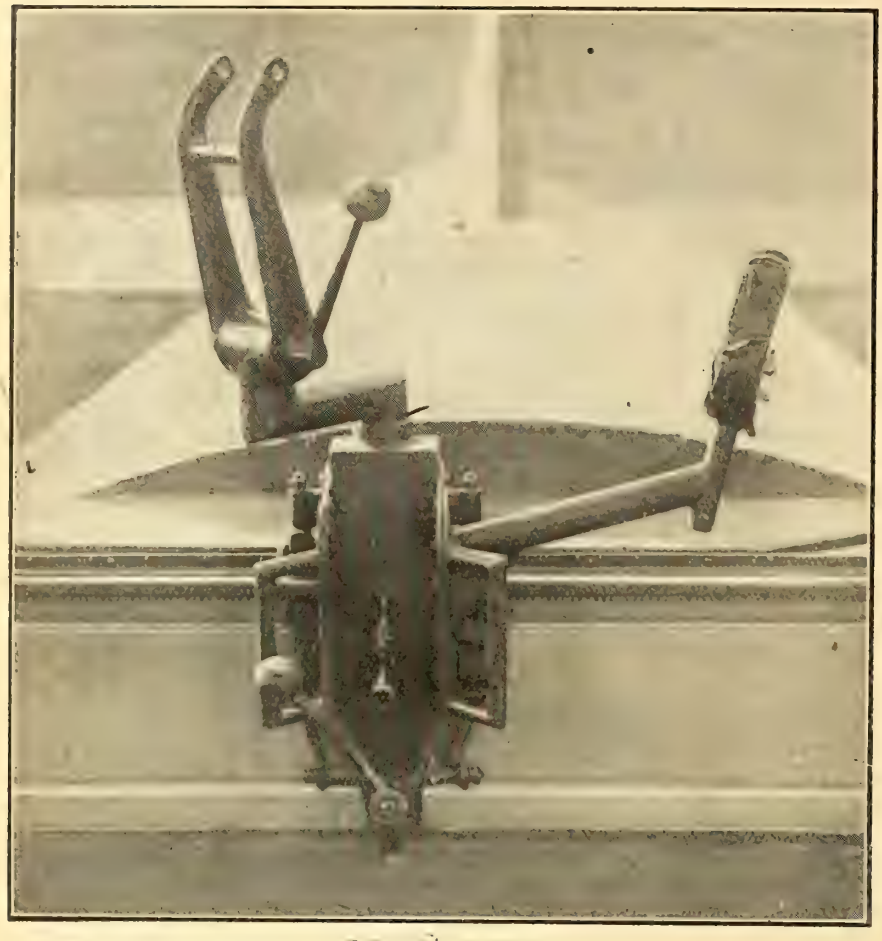
CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

"GWYNNE, LONDON."



(J) Gun Mounting on the After Cock-Pit looking towards the Tail.

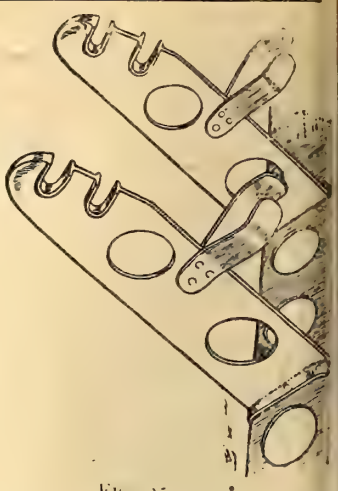
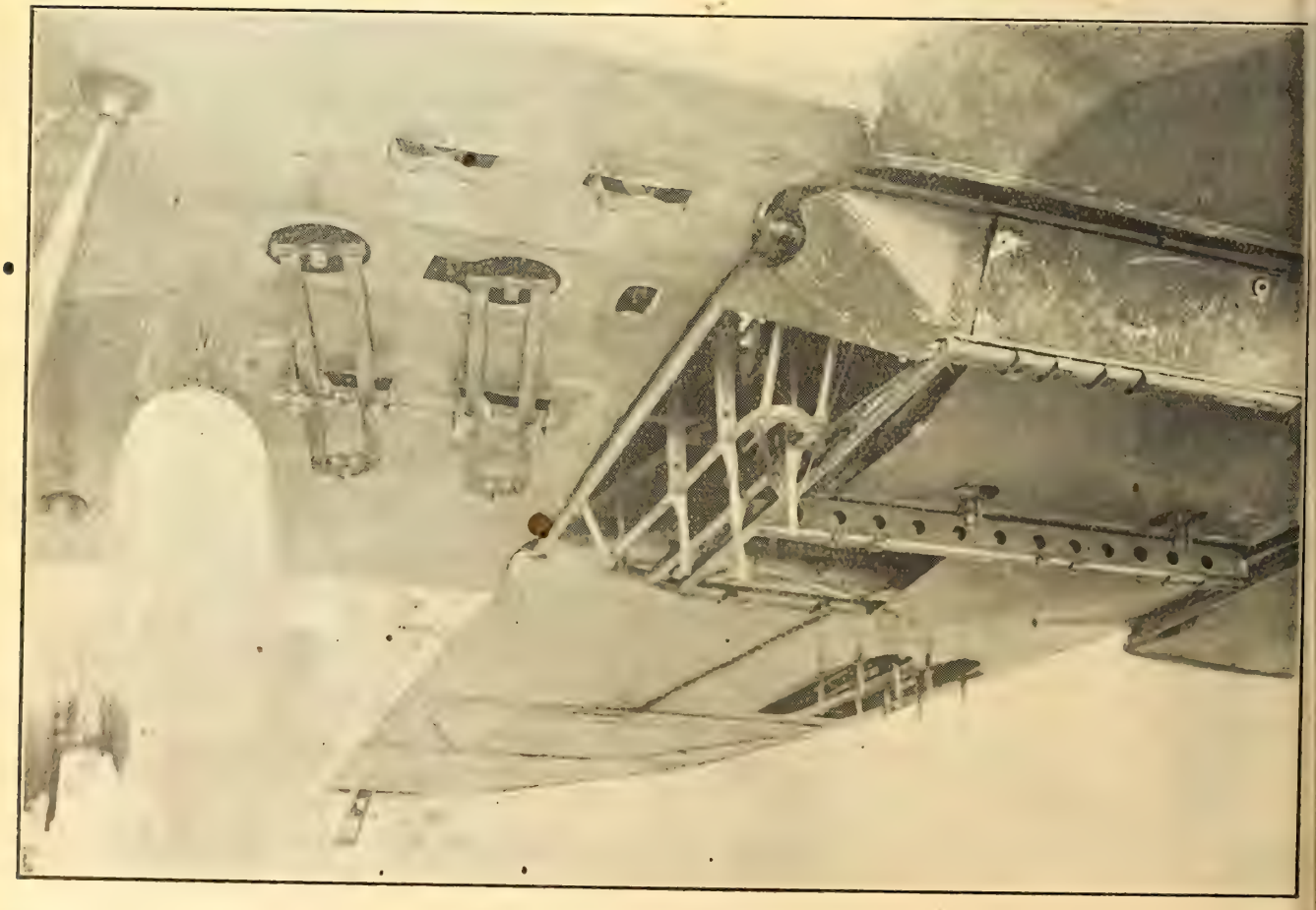


Fig. 25.

covered by a detachable wooden lid whi acts as the floor of the narrow gangw mentioned above. Underneath the cent of the nacelle provision is made for carr ing two or more large bomb racks, whic however, were not in use on th machine. Underneath the lower ma plane, two at each side of the nacelle, a fixed bomb clips which are capable supporting bombs roughly 8 inches diameter. They are held in position by belly-band consisting of two steel strip clearly shown in the photograph (K Eleven-and-a-half inches in front of th clip is a bracket suitable for a circul section of 4 inches in diameter, a $13\frac{1}{2}$ inches in the rear of the cl is a second bracket suitable f a 5 inches diameter section. The bom would thus appear to be 50 kgs. In th photograph the belly-bands are show clipped out of the way. At their fixe end they are supported on a crosshea



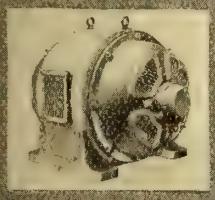
(K) View under the Fuselage, showing Bomb Magazines and Racks, and the Trap Door in the After Cock-Pit.



CABLES.



OVERHEAD LINES.



MOTORS and GENERATORS.



SWITCHGEAR and TRANSFORMERS.

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E.7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159 W. George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

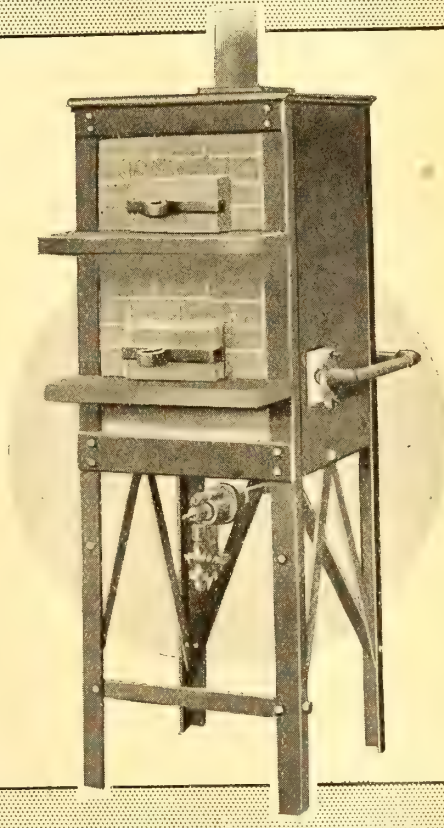
DAVIS
High-Speed Steel Furnaces

THE Davis "D.H.S.T." series of Gas-Fired Furnaces have been specially designed for the hardening of Modern High-Speed Steel Tools, and to provide the maximum of convenience and efficiency at the least practical fuel cost.

The firing element consists of Davis PATENT Air-Blast Burners, for Gas at ordinary main pressure and air at 2 lbs per square inch. Two chambers are provided, each fitted with stopper brick; a pre-heating temperature of 1,000° C being obtainable in the upper chamber and 1,350° C in the lower, whilst the flame does not impinge on the work.

Illustration shows the No. 100 size (each chamber $9\frac{3}{4}'' \times 5\frac{1}{2}'' \times 3\frac{3}{8}''$ inside). Price **£30** complete. Made in 4 other sizes—see Lists F18 A, B and C (gratis).

Also OVENS, MUFFLES, CRUCIBLES, LEAD-MELTERS, etc



THE DAVIS FURNACE CO
(Proprietors, THE DAVIS GAS STOVE CO., LTD.)
DEPT. Q, LUTON

a sketch of which is given in Fig. 26. This in turn is carried on a bracket clipped to a steel tube running parallel to the wing spars and braced thereto by tubular steel girders. The crosshead is free to swivel on the bracket against the action of a coiled spring which, when the bomb has been released, twists the crosshead round against a stop, so that the belly-band is forcibly swung round and now faces the direction of flight instead of lying edgewise on to it. The ends of the steel strips are swivelled on the crosshead, and here again coil springs are used, so that the tendency is for the belly-band to be held flat against the lower surface of the bottom main plane, and out of the way of the other clip.

When the bombs are in position, the rings which are fitted on the free end of the belly-band are caught between the jaws of

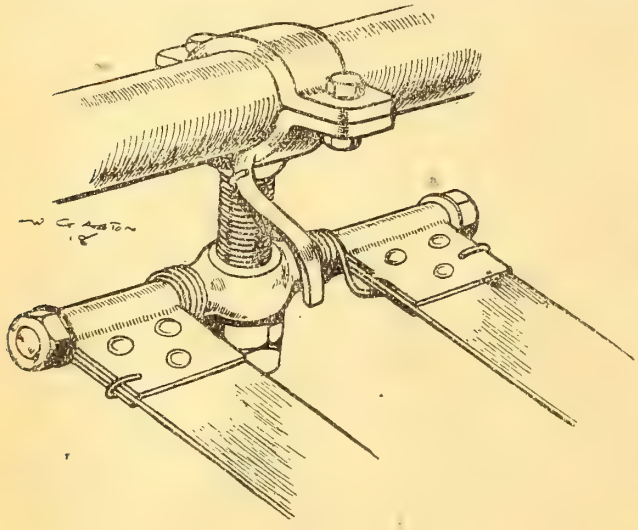


Fig. 26.

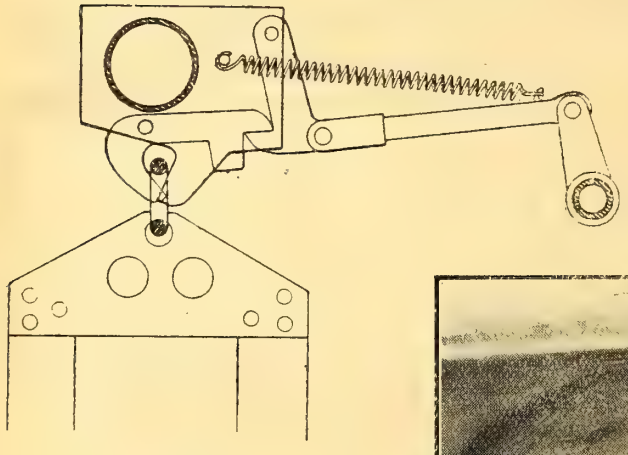


Fig. 27.

a trigger mechanism, illustrated diagrammatically in Fig. 27. This device is carried on the same tube which supports the crossheads, as already mentioned. Lying parallel to this tube and between it and the leading spar is a control rod fitted with two levers which are connected respectively to the two bomb trip gears, and this rod is operated by a quadrant lever mounted in the front cockpit. In order to allow one trip gear to be worked at a time, the link of the outer trip is provided with a slot where it is pivoted to the trigger release. On working the lever in the cockpit, therefore, its first action up to half way over the quadrant is to release the bomb nearest the nacelle, whilst a further movement releases the outer bomb. An exactly similar method is employed for operating the bombs carried underneath the other wing. The levers in the front cockpit are all mounted on a common bracket built up of steel tubes, and are arranged as follows:—First, there are the two levers which control the

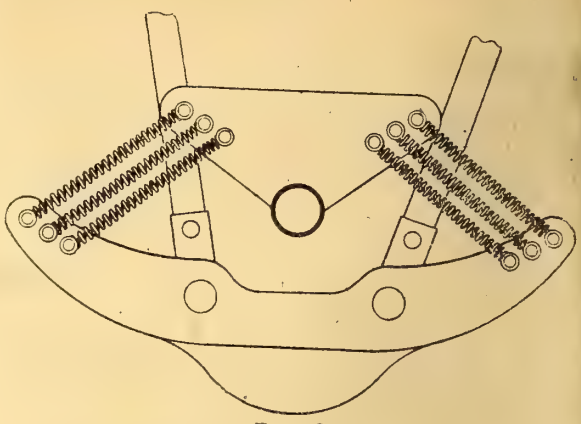
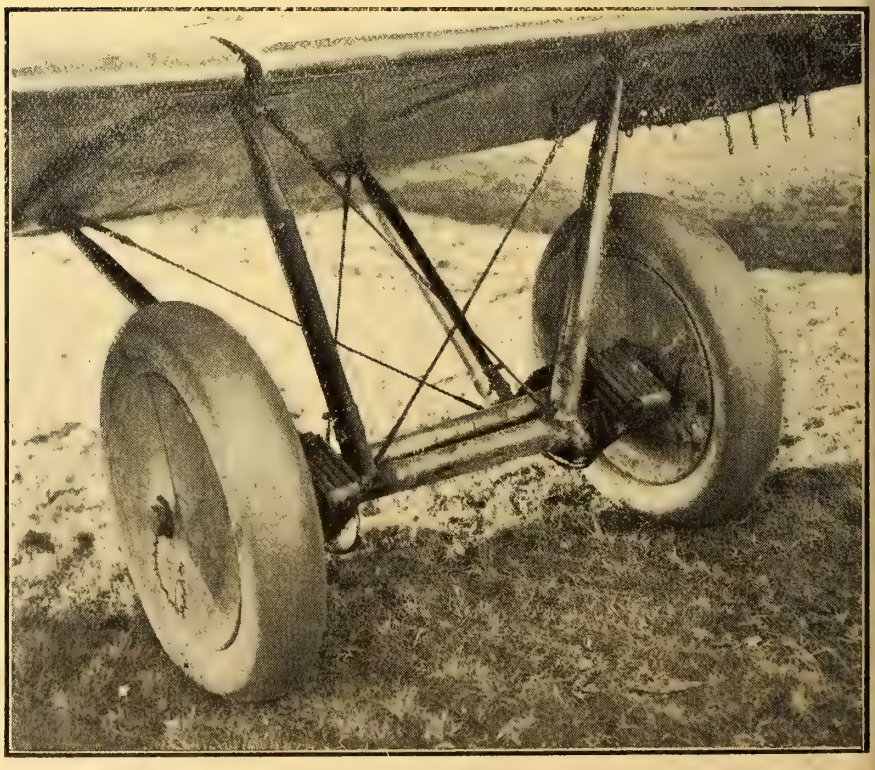


Fig. 28.

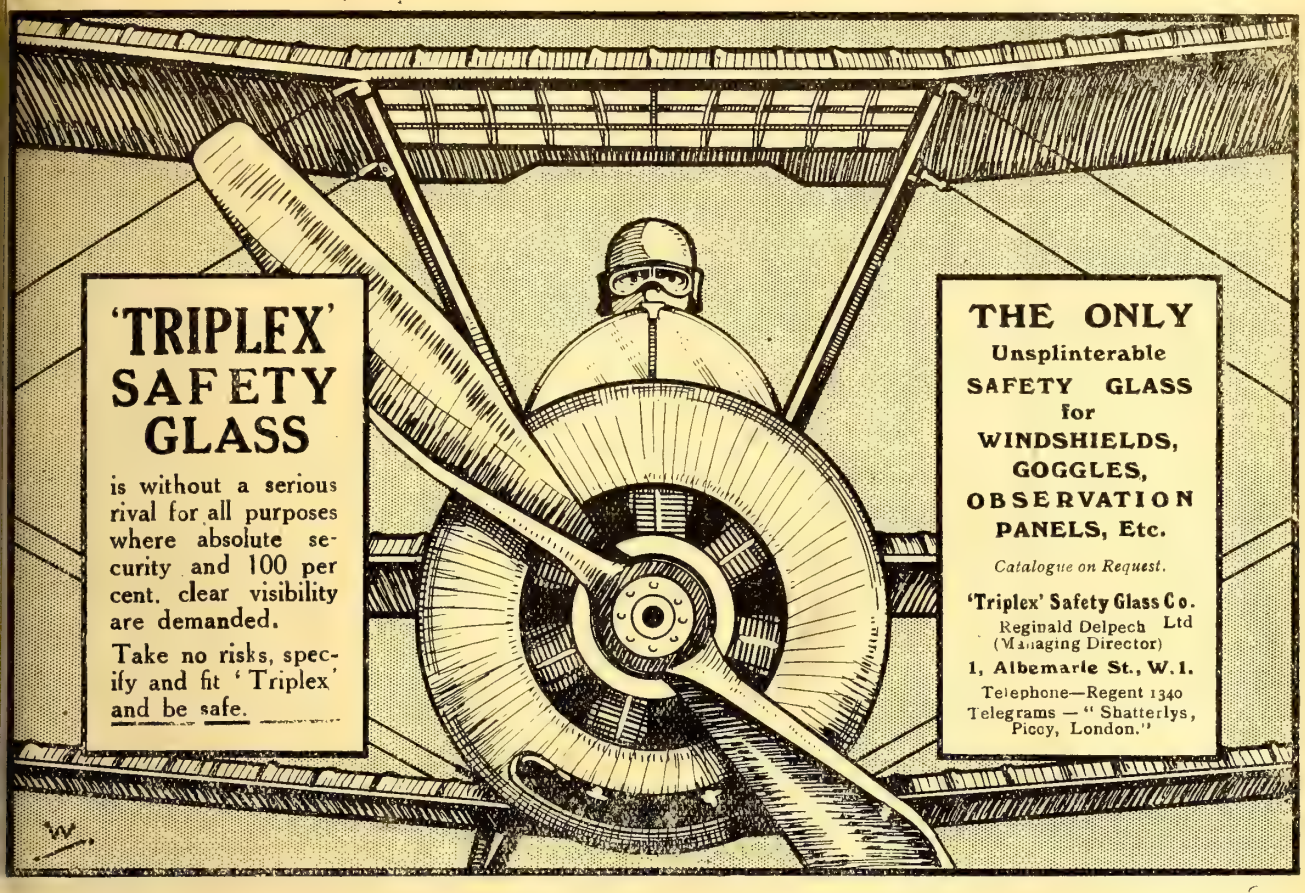
two bomb magazines in the rear cockpit. These are provided with thimbles and chains, so that they cannot be operated accidentally. Next a single lever which controls the large bomb clips on the right wing. These are capable of being secured by split pins inserted in their quadrants. Next, there is a lever which in this particular machine was furnished with no action at all, but is evidently designed for manipulating the large bomb carriers when these are installed. Behind it are, first, a single lever for the left hand outer bomb clips, and, finally, the lever for working the bomb magazine on the right hand side of the nacelle.

Landing Gear.

The landing gear of the A.E.G. bomber is simply an elaboration of that which has become practically a standard fitting on single and two-seaters, except that in this machine the gear is in duplicate. It consists of two axles carrying two wheels a-piece, and suspended from pairs of V struts. One pair is connected to the spars of the centre section immediately underneath the engine strut sockets, and the other to the spars midway between this point and the fuselage and at the same point from which diagonal struts are taken from the spars to the engine mounting and nacelle. This, together with the wire bracing of the landing gear struts, provides a completely triangulated construction. The struts are, however, connected by ball joints similar to those used with the engine struts, so that in case of strain a certain amount of free movement can take place. The pairs of V struts carry at their foot a hollow steel crossbar having the section of a trough, and in this lies the axle which connects the two wheels. As shown in the sketch Fig. 28 and in the photograph (L), the fixed beam has forward and rearward extensions, at each



(L) The Wheels and Undercarriage below the Starboard Power-eggs.



'TRIPLEX' SAFETY GLASS

is without a serious rival for all purposes where absolute security and 100 per cent. clear visibility are demanded.

Take no risks, specify and fit 'Triplex' and be safe.

THE ONLY
Unsplinterable
SAFETY GLASS
for
WINDSHIELDS, GOGGLES, OBSERVATION PANELS, Etc.

Catalogue on Request.

'Triplex' Safety Glass Co.
Reginald Delpech Ltd
(Managing Director)
1, Albemarle St., W.1.
Telephone—Regent 1340
Telegrams — "Shatterlys, Piccy, London."



AERO ENGINES

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

W. H. ALLEN, SON & CO. LTD.

BEDFORD, ENGLAND.

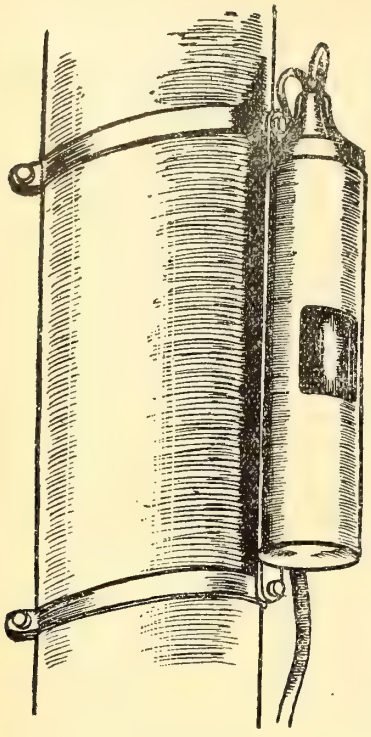


Fig. 29.

end of which are anchored the ends of the batteries of coil springs which act as shock absorbers, and at their other ends are hooked to a horn plate on the wheel axle. Each battery of springs, of which there are four to each axle, consists of 18 springs. A yoke of stranded steel cable restricts the movement of the axle beyond a certain limit. The tyres are 32 ins. × 6 ins. = 810 × 150. A tail skid of massive proportions is used. This is of the shape shown in photograph (G), and is built up entirely of welded steel. The springs against which it works are concealed inside the tail end of the fuselage.

Wireless.

The machine is internally wired for wireless, and a special dynamo for supplying current for this purpose and also for heating is installed on the right hand engine. This dynamo bears the following inscription :—

Telefunken.

J. P. Flieg. C 1916. Type D.

Alternating current 270 watts. 5 amperes. 600 frequency.
Continuous current 50 volts. 4 amperes. r.p.m. 4,500.

The dynamo is mounted on brackets acetylene-welded to the steel engine bearers, and is normally completely enclosed in a detachable fairing. Its position is clearly shown in photograph F. The dynamo drive embraces the pulley which is a standard fitting on the 260-h.p. Mercèdes, but in this particular case the clutch gear whereby the driving pulley can be disconnected from the engine as required appears to have been discarded. Two sets of wires are taken from the dynamo inside flexible metal conduits to a pair of plugs situated at the junction of the fuselage and the right hand lower main plane. Here they terminate in plug sockets, so designed that the plugs cannot be inserted wrongly. One of these wiring circuits applies to the heating system, and wires for this purpose are carried to points in all three cockpits, whilst the other circuit is for wireless and terminates in a plug adaptor in the rear cockpit. No wireless instruments were fitted. Two plug sockets for the heating installations are arranged in the rear cockpit; two in the pilot's cockpit, and one for the forward gunner. A small plate on the pilot's dashboard carries the following inscription, but no definite information is given :—

F. T. Fitting. W/T Set.
Aeroplanes.

Type 94. NY 1125/16.
Fitting, No. 85a.
Driving propeller. Type. Direct coupling.
Length of aerial wires — — — —

F. T. Fitting. W/T Set
Aeroplanes

Telefunken transmitter.— — — metres
Huth transmitter. — — — — metres
D transmitter. — — — metres.
G transmitter. — — — metres.

In addition to these two circuits, there is a lighting installation in conjunction with a battery carried in a box in the rear cockpit. From here, wires are taken to each cockpit and also to the tail and via the leading edge of the upper plane to the extreme outside strut of each wing. On these struts red and green lights are carried, the lamps for this purpose taking the form shown in Fig. 29. Inspection lights are provided at convenient points in each cockpit over the dashboard, instruments, etc.

For the most part the lighting wiring is contained inside a light celluloid conduit.

Instruments.

These comprise twin engine revolution counters, twin air pressure gauges for the petrol supply, electric thermometer, altimeter, petrol level gauges, etc. All of these are of recognised types and call for no detailed description.

Camouflage.

This machine is camouflaged in six different colours on a uniform system covering every portion. The colours are arranged in hexagons measuring roughly 18in. across the flats, and the colours are sage green, reddish mauve, bluish mauve, black, blue and grey. These colours are not flat washes, but are softened by being stippled and splashed with paint of a lighter tone. The effect gained is well shown in photograph G. Considerable care appears to have been taken with this camouflage scheme, which is presumably effective.

Fabric and Dope.

The fabric throughout is of good quality and the dope acetate of cellulose.

Propeller.

Diameter 10ft. 3.8in.
±.2oin.
Pitch 59.3in.

The following table gives the thicknesses of the various laminæ used in construction of the airscrew. The laminæ are numbered from the trailing to the leading edge.

No.	Material.	Thickness in inches.
1	Walnut	.73
2	Mahogany	.80
3	,,	.80
4	,,	.80
5*	,,	.80
6	,,	.80
7*	,,	.40
8*	,,	.40
9	,,	.80
10	Walnut	.83

* These laminations were of a quite different kind of mahogany, probably African.

Only one airscrew has been seen and dimensioned. Thus it is unknown whether all airscrews would have laminæ of similar thicknesses and of similar timbers. There is no apparent reason why these laminæ should be of different thicknesses. It is surmised that either the enemy is short of timber or that he has a highly scientific reason for so doing that we do not know. The port and starboard airscrews rotate in opposite directions.

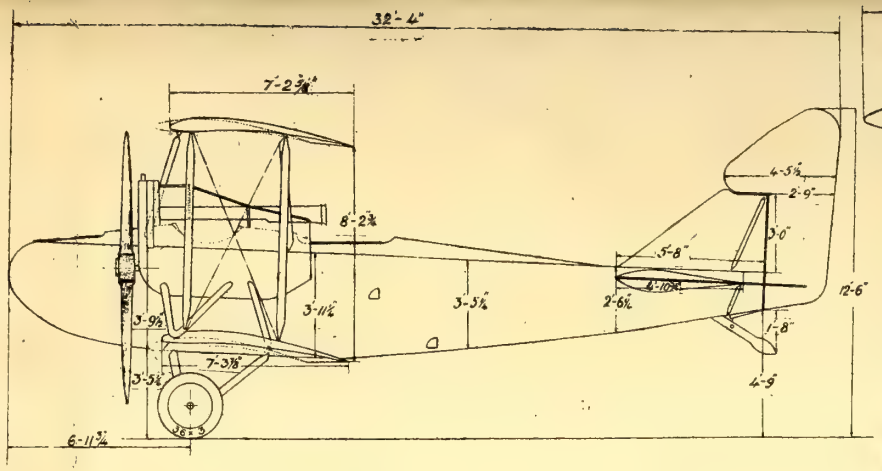
W. G. A., March, 1918.

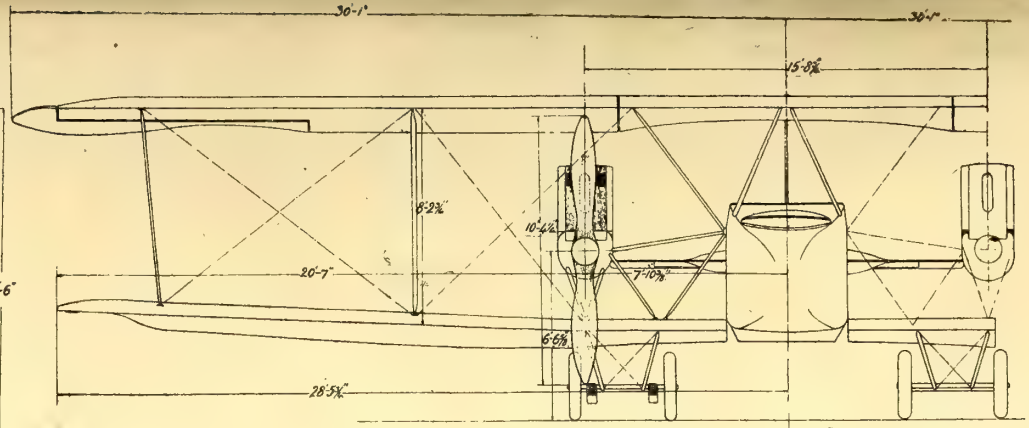
A QUICK NAILING MACHINE.

Aircraft manufacturers who are in the habit of using nails to a large extent in aircraft construction, as for example in nailing down webbs and strips on wings, will be interested in a new nailing machine which has been produced by L. F. Grammes and Sons, of Allentown, Pennsylvania, U.S.A. As this machine has been specially designed for aeroplane work no photographs or illustrations are available, but one assumes that it operates on the same principle as nailing machines for other specific work invented and designed by this same well-known firm. It is claimed for these machines that each machine does the work of a number of people, and does it better and more accurately than by hand. It is said that there is no possibility of the wood splitting in driving in nails and that each nail can be driven in at a uniform distance, which is impossible when driven in by hand. Also the nails can be driven below the surface of the wood so as to allow for the sandpapering of the wood without interference with the heads of the nails and designed in such a way that the points of the nails are clinched over. The machines are positively self-feeding. That is to say, the nails are fed in automatically without the aid of the operator. The nails are thrown into the feed-hopper anyhow and the operation of the hopper causes them to slide down to the point where they are picked off and dropped automatically into the chucks ready to be driven. The picker bar which picks off one nail from each track at a time is in the Grammes machine entirely in one piece, whereas one gathers that in other makes the same work is done by anything between 12 or 40 different parts. An ingenious device removes bent nails which get into the hopper by accident. All adjustments and changes and feed or stroke are conveniently made by hand without the aid of tools. The rate of operation of the machine is apparently only limited by the capacity of the operator.

The Company guarantee to accept delivery at their own expense of any machine returned which is found imperfect on receipt and after inspection, and they are prepared to prove the superiority of the Grammes machine by putting it alongside any other in competition.

Aircraft manufacturers are invited to communicate with the firm to obtain further particulars.





The A.E.G. Bomber.

Two 260-h.p. Mercédès Engines.

Span, 60 ft. 2 in.

Length, 32 ft. 4 in.

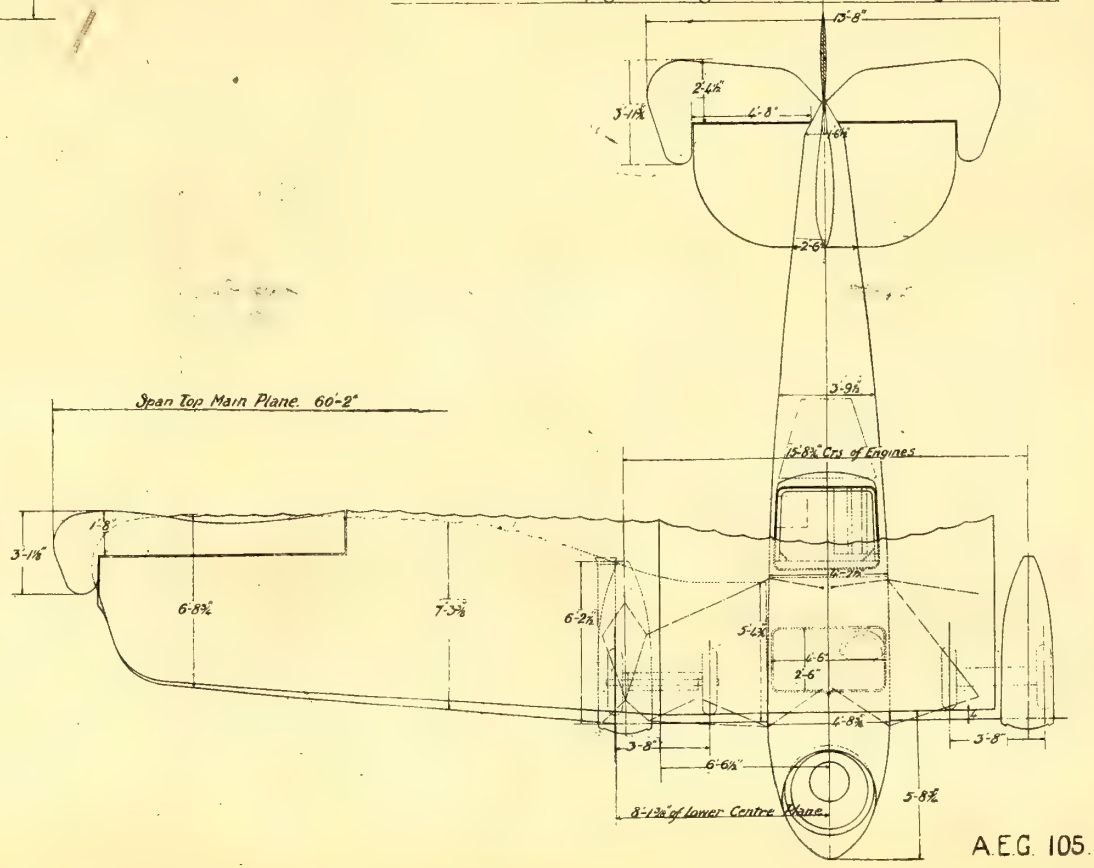
Area, 730.4 sq. ft.

Weight (full), 7,130 lbs.

Weight (empty), 5,258 lbs.

Speed, 90 m.p.h. at 5,000 ft.

Speed, 86 m.p.h. at 9,000 ft.



A.E.G. 105.

ASCOL



THIS BOOK is being ordered by all the largest FIRMS in the AIRCRAFT INDUSTRY. Have you ordered YOUR copy?

THE "Ascol" Book is an encyclopædia of aviation; it contains the following sections:—

1. A.G.S. Parts (showing working drawings).
2. "Ascol" Chart Section.
3. Reprints of the Articles from "Aircraft Supplies."
4. A Beginner's Guide.

It is the vade mecum of Aircraft Parts.

Sold for charity at **3/6** per copy; a specially limited edition of 1,000 copies at 10 6 per copy. (Postage 6d. extra).

Firms engaged in the Aircraft Industry can order Copies of this Book to be invoiced as usual.

THE
AIRCRAFT SUPPLIES
COMPANY LTD
ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

Telephone: Gerrard 276. *Telegrams: "Upcast, Rand, London."*

G. H. MANSFIELD, Managing Director.

SBAC
The Society of British Aircraft Constructors

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

THE AIRCRAFT TRADER

MARKET TOPICS.

Prices are for quantities on the usual terms.

COPPER.—The output of Copper is still very satisfactory. The refineries are, however, being very hard pressed and are only with difficulty keeping pace with the demand.

The American authorities have now decided that the official price for Copper should remain at 23.50 cents. per lb., this price to remain in force for a period of 75 days from June 1st, 1918. Judging from recent financial returns of the majority of producers, the price can certainly be considered liberal.

It was pointed out in THE AEROPLANE last week that there was not much hope of the price of Copper being increased, the general opinion being that the agitation for an increase was engineered in order to guard against a reduction.

Current Prices.

Standard Copper	£110 0 0
Electrolytic	£125 0 0 to £121 0 0
Best Selected	£123 0 0 to £119 0 0
Sheets	£149 0 0

TIN.—This market is in a much more healthy condition, and the situation is easier. Very fair quantities have recently been received, and the report that U.S.A. is obtaining supplies from Java has had a favourable influence upon the market. The situation in America is, however, still very unsatisfactory, and it is understood that U.S.A. intend taking steps which should result in considerable improvement, the effort to reduce the quantity of Tin used being of primary importance.

It is gratifying to note that the prices in the East, while still at an abnormal figure, are gradually declining. The same remark applies to prices here. Supplies of Tin here are very satisfactory and buying has recently been fairly brisk.

Comparative Prices.

To-day	£355 0 0 per ton.
May 22nd	£360 0 0 per ton.
May 14th	£370 0 0 per ton.
May 10th	£380 0 0 per ton.
April	£320 0 0 per ton.

LEAD.—There is plenty of Lead available for national requirements, and the position is gradually improving. It is now possible to obtain up to 28 lbs. direct from supplies without special licence. A declaration must be made before the Lead can be supplied. Prices remain unchanged.

STEEL.—There is now no difficulty in obtaining supplies of round Steel for aircraft construction. It is more difficult to obtain hexagons, but the position is rapidly improving. Furthermore, it is again reported that U.S.A. will be sending large supplies of raw material shortly. This information must be treated with reserve, and in any case it is doubtful whether it will have any direct influence upon the production of aero Steels.

High Speed Steel is still difficult to obtain, but supplies of Cast Steel are very favourable.

Prices remain unchanged.

TIMBER.—The Timber position is still as serious as ever. It is stated that certain Deals have been supplied to some firms as a Silver Spruce substitute. In the first place, the chances of these passing VI specification are very remote; and even if they do pass, the percentage of scrap is bound to be appalling, especially if the A.I.D. continues inflexibly to adhere to the strict letter of the standard fixed for wood parts.

It is, of course, generally agreed that the situation bristles with difficulties and the authorities handling this problem have a rough passage before them.

It is reported that the Government are taking over all the Cyprus which has been imported. The Timber is, of course, quite good for other purposes, and if put on the market should yield a fair profit. The most serious side of this business is not the money that the country will lose on unusable Timber. In fact there should and probably will not be any loss, except the loss of output of machines and expense of scrapped, finished, and partly finished components and also the wastage of shipping and labour handling the Timber. Walnut is very scarce. Mahogany is fairly easy to procure. There does not, however, appear to be a superabundance.

It is rumoured that the Air Ministry will take over the control of Plywood shortly. If the information is correct, it is to be hoped that the responsible department will take into their counsel the few firms who have up to the present so satisfactorily kept the aircraft factories supplied.

If the whole question is left to SM7, it is practically certain that the control of production, supply and prices will be carried out in conjunction with suppliers and users, and due consideration given to the requirements of each, and, after all, who are better able to give advice on the Plywood question than the heads of firms who have been manufacturing and importing all their lives.

If, on the other hand, Plywood control is left to the Timber Controller, it is more than likely that there are stormy times ahead. However, the whole question appears to be in the air at present, and further comment is not advisable until an official announcement has been received.

Prices remain unchanged.

FABRIC.—Supplies have so far been very satisfactory. The most anxious time will be between June and the flax crops. There is good reason to believe that the authorities are well prepared and have good stocks in hand.

Official prices are unaltered.

TIMBER WASTAGE.

Professor Groom, reading a paper in the hall of the Society of Arts on May 15th, said the fact that though we had in the United Kingdom timber eminently suited for use in aeroplane building, we were not aware of it at the beginning of the war, while Germany knew of it, and instantly made use of it. Last year tests showed that in the South of England and the Highlands of Scotland the Scotch pine could yield slowly-grown timber equal to the highest demands ever made on wood, namely, use in vital parts of aeroplanes. Germany, having made thousands of tests on the structure of Scotch pine growing in various of her forests, was able instantly to secure rich supplies of wood of exactly the quality required for aeroplanes. But in this country when the war began we did not know the mechanical values of any kind of timber whatsoever grown in the United Kingdom. Dealing with the fireproofing of woods, the speaker said investigations had rendered it possible to such an extent that thin 3-ply wood could be made to resist for minutes, or even hours, a temperature of 3,000 degrees Fahrenheit. The process of fireproofing was not, however, cheap.

Mr. Howard said that the amount wasted on wood by the Government was absolutely criminal. They had issued an advertisement for Oregon pine at 8s. per cubic foot, when its pre-war and proper price was 1s. 6d. per cubic foot. But why did they use this wood when the most suitable was one that they would not allow the public to pay more than 10d. per cubic foot for? In another case, was anything more absurd than that they should insist on first Archangel wood when larch was ideal for the purpose?

Professor Groom said that woods of inferior quality could be improved by changing their colours and thereby improving their decorative value. Except production of fumed oak by ammonia vapour this branch of industry has been neglected. Grey sycamore was obtained from white sycamore, and yet for years white sycamore was exported from England to Paris or Hamburg for treatment and reimported at a price 50 times the cost of the process. He knew of one wood-using establishment in which the normal annual loss or wastage of timber represented £60,000.

ON WIRELESS TELEGRAPHY AND TELEPHONY.

Now that radiography of all kinds is performing such a part in Naval and Military aeronautics, reliable literature on the subject will command a ready demand by those concerned with aeronautics.

The Marconi Company has always been very enterprising in the production of literature concerned with wireless, and the year book on Wireless Telegraphy and Telephony just produced is testimony to the wide field now covered by the science.

To the uninitiated reader the table of definitons of terms used in wireless should be illuminative, no less than 240 definitions being given. In addition to this there is a dictionary of technical terms in English, French, Spanish, Italian, and German, a feature of interest to wireless operators working in foreign parts.

Copies may be obtained from The Aeroplane and General Publishing Co., Ltd., 2, Breams Buildings, London, E.C.4, price 6s. 6d. post free.

CANNONS' (LINCOLN) AEROPLANE GLUES

"IL PROPELLER" (Cake Glue)
FOR PROPELLERS.

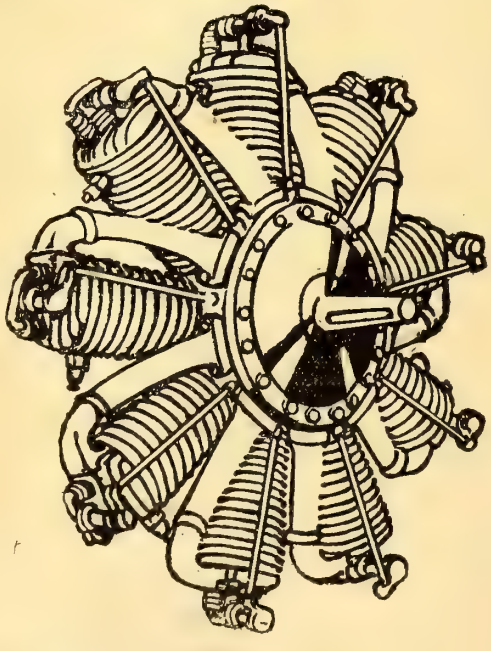
"AERIAL" (Cake Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

"XL1" MIXTURE (Jelly Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

"B1" (Cake Glue)
FOR CLASS 2 WORK.

SOLE MANUFACTURERS:

B. CANNON & CO., LTD., LINCOLN.



F. W. BERWICK & CO., LTD.

AEROPLANE & AERO ENGINE MANUFACTURERS TO THE AIR COUNCIL.

PARK ROYAL :: LONDON, N.W. 10.
Telephone: Willesden 2490 (5 lines).
Proprietors and Manufacturers of Sizaire-Berwick Cars.

AIRCRAFT FINANCE

CURRENT TOPICS.

MORE MONEY WANTED.

Necessity is forcing the Government to devise the means for raising more money in order to carry on the war. Ere long we shall learn what they intend to do. A forced loan would be objectionable in every sense, but nevertheless the fact remains that in spite of the generous terms and convenient forms of present borrowing—i.e., Treasury Bills and National War Bonds—the receipts are quite inadequate. It is an interesting, and, at the same time, an awkward position.

HOPELESS CONFUSION.

The Excess Profit Tax may or may not be a just imposition, but the trouble that it is causing and the quibbling it is provoking in the company world is really beyond a joke. There are hundreds, aye thousands, of joint stock undertakings that are behind with their accounts for a couple of years, simply because of the inability to arrive at an understanding with the authorities as to the actual amount of profit they are legally entitled to.

Admittedly they paid dividends provisionally, but the shareholders, in the absence of any detailed profit and loss account and balance-sheet, are in the dark as to the real position. Admittedly the incidence of the levy on profits has produced hundreds of awkward questions, but surely by this time some equitable basis acceptable to both parties ought to have been arrived at.

EXTRAORDINARY DILATORINESS.

It was at the beginning of April that the public were invited to subscribe for shares in the Whitehead Aircraft Co., and yet there is no market in the London Stock Exchange in the shares. Subscribers are quite reasonable in asking Why? There has been ample time to create a market; indeed, in ordinary circumstances there would be dealings in the shares very soon after the Subscription Lists had been closed.

A MARKET IS NECESSARY.

We do not know of any reason for the laxity of those who sponsored this issue. There is no getting away from the fact that one of the principal virtues of an investment security is its marketability. The sooner that arrangements are completed for dealings to take place in these particular shares the better. Is it not natural that when people invest money in shares they expect to see how the market price of them fluctuates day by day? Nothing is more natural.

AIRCRAFT SHARES ACTIVE.

Aircraft and kindred shares continue to claim a good deal of interest in the Stock Exchange. For example, Aircraft Manufacturing Participating "B" Preference have been quietly bought at 23/- each and the 7% Cumulative Preference have attracted some buyers at 23/3. The latter, by the way, receive their dividend free of income tax up to the limit of 5/- in the £. This is the great attraction, of course, for if the dividend was subject to the deduction of tax the shares would probably be selling under 19/- each.

Rolls-Royce shares have been a good market in the neighbourhood of £2 and there has been persistent buying of Vickers at about 41/6. Quite recently the directors of Vickers carried out certain amendments in the Articles of Association so as to be able to form an auxiliary or subsidiary company. People are very interested to know what object they have in view.

FRENCH COMPANY'S EXTENSIONS.

It is announced that the Automobile de Place Co., a French undertaking intimately concerned with the aeroplane industry, has just opened another factory which is to be devoted solely to aircraft construction. Quite recently the accounts for last year's working were published. The profit shown was 1,438,110 francs in comparison with 1,322,998 francs, an improvement attributed to the higher prices which became operative in the earlier part of the year. At the same time higher costs in every direction had to be contended with. The dividend of 8 francs per share compared with 7½ francs.

LOOKING AFTER PETROL.

One of the most consistently bright sections of the Stock Exchange is that devoted to oil shares. It is therefore appropriate to record the fact that an Inter-Allied Petroleum Organisation, in which Great Britain, France, the United States and Italy are interested, has just been formed to consider and deal with the petroleum—and we suppose petrol—problems of the Allies in connection with the war. At the Paris Conference, the British Government were represented by Professor J. Cadman, (Chairman), Mr. G. H. Ashdown and Mr. J. Graham. Mr. Alexander Fraser is the Secretary, and the headquarters of the conference are in the offices of Mr. Walter Long's Petroleum Executive, at 12, Berkeley Street, W.1.

SOME HIGH PRICES.

The United States Government has just commandeered the stocks of platinum, palladium and iridium in that country and has fixed the respective prices at £21, £27 and £35 per troy ounce.

ELECTRIC CONSTRUCTION PROFITS.

This company, which is paying a bonus of 2½ per cent. in addition to the 7½ per cent. dividend, shows a net profit of £66,826 against £51,504 and £9,326 against £12,389 is added to the reserve.

ENQUIRIES.

Enquiries have been received relating to investments in companies concerned with the aeroplane industry. A particularly interesting one is that of an Aberdonian in the R.A.F. He wants to know whether the shares of Vickers and those of Rolls-Royce are worth considering, and without hestitation we can say that both constitute first-class investments of their individual types.

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

The files of the following new companies are available for inspection at Somerset House.

SUNBURY AVIATION CO., LTD.—Private company. Registered May 22nd. Capital, £10,000 in 9,000 preference shares of £1 each and 20,000 deferred shares of 1s. each. To manufacture, buy, sell, let on hire, and deal in aeroplanes, balloons, airships, or any other appliances or machines for aerial navigation, motor-cars, carriages, mechanical engineers, etc. The subscribers (each with one share) are:—H. N. Ballantyne, Curlee, Irnerleithen, woollen manufacturer; G. F. Hird, Linderwood, Beckenham, Kent, woollen merchant. The first directors are:—H. N. Ballantyne and G. F. Hird. Registered office: 32, Charing Cross, S.W.1.

MAGNETO AND SPARE PART CO., LTD.—Private company. Registered May 21st. Capital, £1,000 in £1 shares. Objects as indicated by the title. The subscribers (each with one share) are:—G. Malham, Rothesay House, Beaufort Road, Edgbaston, Birmingham, engineer; S. H. Parrott, 227, Broad Street, Birmingham, magneto expert. The first directors are:—G. Malham and S. H. Parrott. Registered office: 227, Broad Street, Birmingham.

WILLIAM SAINT, LTD.—Private company. Registered May 27th. Capital, £20,000 in £1 shares (3,000 6% cumulative preference). Builders, contractors, dealers in timber, bricks, tiles and building materials, aeroplane builders, sawyers, sawmill proprietors, etc. The subscribers (each with one ordinary share) are:—W. Saint, 8, St. Barnabas Road, Cambridge, builder, contractor and timber merchant; G. F. Saint, 8, St. Barnabas Road, Cambridge, builder, contractor and timber merchant. Table "A" mainly applies. Qualification, £500. Registered office: 8, St. Barnabas Road, Cambridge.

WINDING UP.

NORMAN THOMPSON FLIGHT CO.—In the Companies' Winding-Up Court, on May 28th, the petition of the Palmer Tyre, Ltd., for the compulsory liquidation of the Norman Thompson Flight Co., Ltd., which had stood over for a scheme of arrangement to be formulated, was again mentioned to Mr. Justice Astbury.

Mr. Frank Evans, for the petitioners, stated that a committee of creditors had been appointed and a scheme was in fact in progress. The company wanted the matter to stand over for another month, and he did not object. Mr. Hunt, who appeared for creditors for over £6,000, had intimated that they were unaware of the petition, and therefore had not given notice that they would appear.

His lordship: Treat them as having given notice and let the petition stand over for a month.



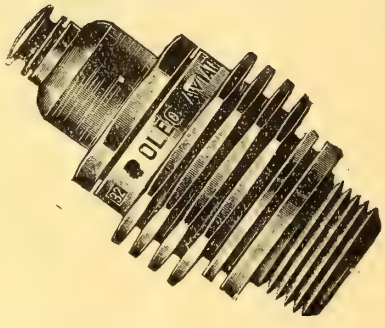
A GREAT SCOT AND THE LITTLE FARM HE WELL TILLED!

"Ideal car for a medical man. Will never fail him . . . Speedy, silent, and a good hill climber. 24 miles to the gallon."

—Pre-War Letter.

THE POST-WAR A.-J. CAR will be even something better.

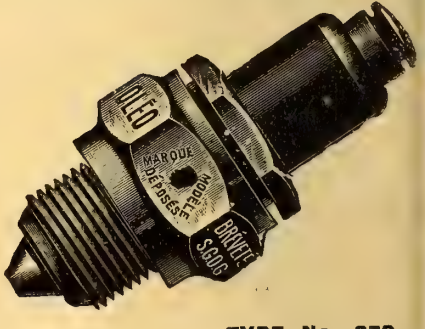
Arrol-Johnston Ltd.
DUMFRIES.



TYPE No. 32.



"The Smile of Success."



TYPE No. 27G.

OLEO were the first Aero Plugs ever made.
OLEO won the Aero Grand Prix SIX TIMES in succession.
OLEO Plugs have been supplied to the Government since 1913.
OLEO Aero Plugs have the "Largest Sale in the World."
OLEO Plugs have won over £30,000 in prizes.
OLEO Plugs were the first to Loop the Loop.
OLEO Plugs were the first to Cross the Alps.
OLEO Plugs are supplied to NINE Governments.

OLEO PLUGS
LEO RIPAULT & Co.
64a POLAND ST. LONDON, W.
TELEGRAMS RIPAULT REG. LONDON. TELEPHONE GERRARD 7758.

(*Continued from page 2062*)

and five tons of bombs were dropped by us on various targets, including billets at Armentières and Valenciennes railway station.

One of our night-bombing machines failed to return.

On the 29th inst. a number of our long-distance day-bombing machines attacked Thionville, and dropped a ton of bombs with good effect on the station and sidings. At the same time other machines bombed the railway and barracks at Metz-Sablon.

In spite of hostile attacks from the air and ground, all our machines returned safely.

MAY 30th, 8.40 p.m.—Low clouds and poor visibility prevented much work being done by our aeroplanes on the 29th inst. until late in the day, when the weather cleared.

Five German machines were brought down in air fighting, and one other was driven down out of control.

We lost no machines.

Five tons of bombs were dropped by us during the day on ammunition dumps and billets in the neighbourhood of Armentières and Bapaume.

Bombing continued during the night of the 29th-30th inst., and 16 tons of bombs were dropped, without the loss of any of our machines, on railway stations, including those at Valenciennes and Busigny, on towns and roads behind the enemy's lines, and on Bruges Docks.

In addition to the raids reported on the 29th inst. our machines heavily bombed the railway triangle at Metz-Sablon on the night of the 28th-29th.

All our machines except one returned safely.

MAY 31st, 10.1 p.m.—On the 30th inst. our aeroplanes and balloons were very active, fine weather enabling much work to be done in co-operation with the artillery, as well as reconnaissance and photography.

Bombing was carried out vigorously all day, 38 tons of bombs being dropped on different targets, including railways, roads, dumps, and billets at Merville, Armentières, Bapaume, Albert, and Valenciennes.

Twenty-eight German machines and two German balloons were destroyed during the day, and six other hostile aeroplanes were driven down out of control.

Five of our machines are missing.

On the night of the 30th-31st inst., 17 tons of bombs were dropped by us.

Bruges docks were again attacked and large fires started.

In addition, 4½ tons of bombs were dropped by our long-distance night squadrons on railway stations and sidings, on Metz-Sablon, Thionville, Courcelles, Karthus (south of Tréves), and Esch.

All our machines returned.

JUNE 1st, 10.4 p.m.—On May 31st our aeroplanes and balloons again carried out much successful work.

During the morning our long-distance bombing machines crossed the Rhine, and, in spite of strong opposition from enemy aircraft, dropped over a ton of bombs on the station and workshops at Karlsruhe.

One of the machines engaged in this raid failed to return.

Another group of our aeroplanes dropped a ton of bombs on the railway triangle at Metz-Sablon with good effect and without loss.

A further 31 tons of bombs were dropped by us in the course of the day on different targets behind the enemy's line.

Twenty German machines were destroyed in air fighting and six were driven down out of control. One other hostile machine was shot down by anti-aircraft fire.

One of our machines is missing.

During the following night 16 tons of bombs were dropped by us, including six tons on Bruges docks and on the Zeebrugge-Bruges Canal.

In addition, four tons of bombs were dropped on the railway junctions and stations at Metz-Sablon, Karthaus, and Thionville.

All our night-bombing machines returned safely.

One German night-bombing aeroplane was brought down in flames behind our lines.

JUNE 2nd, 9.25 p.m.—On June 1st fine weather enabled our aeroplanes and balloons to carry out much useful observation work.

In air fighting 21 German machines were destroyed, and four other hostile machines were driven down out of control. Four of the enemy's observation balloons were also destroyed by our aviators.

Four of our machines are missing.

In the course of the day we dropped 20 tons of bombs, successful attacks being made on Zeebrugge Mole, the railways at Armentières, Rosières, Busigny, and Flers, and on other targets.

In addition, the railway at Karthaus and Metz-Sablon were heavily attacked by our long-distance bombing aeroplanes.

One of these machines failed to return.

The night of June 1st-2nd was misty, but five tons of bombs were dropped by us on targets in the Somme Valley without the loss of any of our machines.

JUNE 3rd, 8.45 p.m.—On the 22nd inst. our aeroplanes carried out a good deal of observation for the artillery, and took many photographs.

Eighteen tons of bombs were dropped by our aeroplanes, and heavy machine-gun fire from the air was directed upon a great variety of targets.

Eight German machines were destroyed in air fighting, and 14 were driven down out of control.

Three of our aeroplanes are missing.

On the night of June 2nd-3rd we bombed Le Cateau, St. Quentin, and Valenciennes railway stations, dropping eight tons of bombs.

All our night-flying machines returned safely.

WAR OFFICE COMMUNIQUÉS.

MAY 31st.—The G.O.C. Macedonia reports :—

On May 24th a hostile aeroplane was forced to land at Karaorman (near Kavalla), where it was bombed and destroyed. On the 28th another enemy machine was shot down in flames near the Vardar.

JUNE 1st—The G.O.C. Mesopotamia reports :—

On May 30th our aeroplanes dropped bombs throughout the night on the enemy's camps at Fathah (on the Tigris above Tekrit) and near the junction of the Lesser Xab with the Tigris.

THE CASUALTY LIST.

NAVAL.

Reported May 30th.

DIED OF ACCIDENTAL INJURIES.—Wainwright, F., Act. Air Mech., 1st Gr., F.28508.

INTERNED PRISONERS.—TRANSFERRED FROM GERMANY TO HOLLAND.—Mullins, R., Ch. P.O. 2nd Gr., F.1343; Sturdy, W., Air Mech., 2nd Gr. F.6746.

MILITARY.

Reported May 29th.

AUSTRALIAN FORCE.—ACCIDENTALLY KILLED.—George, Lt. L., A.F.C.
Lord, Sec. Lt. J. S., A.F.C.
Sherar, Sec. Lt. R. O., A.F.C.

WOUNDED.—Duigan, Capt. J. R., A.F.C.; Paterson, Lt. A. A.F.C.

Reported May 30th.

The following officers who were prisoners in Germany have now arrived in England :—

Fosse, Sec. Lt. E. L., R.F.C.; Watson, Sec. Lt. A., R.F.C.

CANADIAN FORCE.—Sliter, Lt. E. D., Can. Rly. Troops, attd. R.F.C.

Reported June 1st.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Morey, Lt. A. W., M.C., R.F.C.
Sisley, Sec. Lt. D. L., R.F.C.

AUSTRALIAN FORCE.—ACCIDENTALLY KILLED.—Carr, Sec. Lt. H. G., A.F.C.

WOUNDED.—Stutterd, Sec. Lt. D'A. K., A.F.C.

MISSING.—Barry, Lt. O. C., A.F.C.

Reported June 3rd.

CANADIAN FORCE.—KILLED.—Turner, Lt. G. J., Man. R., attd. R.A.F.

WOUNDED.—Kincaid, Lt. H. R., E. Ont. R., attd. R.A.F.

DIED OF WOUNDS.—Spence, Lt. L. C., M.C., Can. F.A., attd. R.A.F.

MISSING.—Bell, Capt. R. W., W. Ont. R., attd. R.A.F.; Carter, Maj. A. D., D.S.O., N.B.R., attd. R.A.F.

* * *

CASUALTIES AMONG THE WARRANT OFFICERS, N.C.Os., AND MEN OF THE A.F.C. THE DATES ARE THOSE OF THE OFFICIAL LIST.

DIED OF WOUNDS.

MAY 20th.—Carlile 1437 C. H.

WOUNDED.

MAY 22nd.—Brackley 1581 W. W.

AIR FORCE.

Reported May 29th.

KILLED.—Howell, Lt. E. I., Northn. R. and R.A.F.
King, Lt. V., Royal Marines, attd. R.A.F.
Lake, P.F.O. H. C., R.A.F.
Munt, Sec. Lt. R. R., R.A.F.
Ridgway, Sec. Lt. P. A. F., R.A.F.
Saunderson, Capt. S. T., Nth. Irish Horse (S.R.) and R.A.F.
Sheil, Sec. Lt. C., R. Muns. Fus., attd. R.A.F.
Shooter, Sec. Lt. J. H., M.C., Yorks and Lancs R., T.F., attd. R.A.F.
Whitmill, Lt. G. H., R.A.F.

WOUNDED.—Bremickar, Sec. Lt. C. T., R.A.F.; Day, Sec. Lt. R. C., R.A.F.; Higgs, Sec. Lt. G. W., R.A.F.; Middleton, Capt. J. A., M.C., R.F.A., T.F., and R.A.F.; Mosby, Lt. J. E. G., R.A.F.; Riley, Sec. Lt. G. R., R.A.F.

MISSING.—Dunnett, Sec. Lt. L. E., R.A.F.; Hill, Sec. Lt. A. H., R.A.F.; Prosser, Sec. Lt. D. H., R.A.F.; Stransom, Sec. Lt. N. G., R.A.F.

Reported May 30th.

KILLED.—Knight, Sec. Lt. G. B., R.A.F.
Lefebvre, Sec. Lt. R. H., R.A.F.
Morgan, Sec. Lt. L. L., R. Welsh and R.A.F.
Proctor, Sec. Lt. C. A., R.A.F.
Smith, Sec. Lt. D. G., Middx. R., attd. R.A.F.
Whitcut, Lt. H. M., S. Staffs. R., attd. R.A.F.

WOUNDED.—Brook, Sec. Lt. C. A., R.A.F.; Code, Sec. Lt. A. L., R.A.F.; Hine, Sec. Lt. A. C., R.A.F.; Sinclair, Lt. C. M., A.S.C. and R.A.F.; Thompson, Sec. Lt. L. M., R.A.F.; White, Lt. H. W., R.G.A., attd. R.A.F.; Wrigley, Sec. Lt. F. H., Res. Cav., attd. R.A.F.

MISSING.—Jones, Sec. Lt. A. V., R.A.F.; McBain, Lt. G. B. S. (D.S.C.), R.A.F.; Parkinson, Lt. G. R. J., R.A.F. (late R.N.A.S.); Rowdon, Sec. Lt. A. W., R.A.F.; Shields, Sec. Lt. C. G. S., R.A.F.; Spencer, Sec. Lt. W., R.A.F.; Whateley, Sec. Lt. G. A., R.A.F.

Reported May 31st.

KILLED.—Bennett, Sec. Lt. O. D., R.A.F.
Blair, Sec. Lt. T. F., R.A.F.
Dunfee, Flt.-Sub-Lt. W. V., R.A.F.
Ford, Sec. Lt. C. J., R.A.F.
Hall, Sec. Lt. G.L.D., R.A.F.
Harrison, Capt. N. V., R.A.F.
Levy, Sec. Lt. A. G., R.A.F.
McCarter, Sec. Lt. D., R.A.F.
McDonald, Sec. Lt. J. G., R.A.F.
Palardy, Lt. G., R.A.F.
Proudfoot, Sec. Lt. C.D., S. Notts Huss. and R.A.F.
Robinson, Sec. Lt. C. C. E., R.A.F.
Smith, Sec. Lt. E., R.A.F.
Smith, Lt. R. E., Northd. Hrs. (T.F.), attd. R.A.F.
Whitehead, Sec. Lt. E. J., R.A.F.

WOUNDED.—Bilson, Sec. Lt. W. R., R.A.F.; Bird, Lt. G. A., R.A.F.; Black, Lt. C. E., Arg. and Suthd. Highrs. and R.A.F.; Davies, Pro. F/O J. B., R.A.F.; Green, Sec. Lt. F., R.A.F.; Henderson, Sec. Lt. D., Sea. Highrs., attd. R.A.F.; Hendrie, Sec. Lt. E. T., R.A.F.; Mackenzie, Sec. Lt. J. P., R.F.A. and R.A.F.; Pinder, Sec. Lt. W. L., R.A.F.; Nathan, Sec. Lt. E. N., D.C.L.I. and R.A.F.; Shapley, Sec. Lt. C. J., R.A.F.; Stephenson, Sec. Lt. A. C. P., R.A.F.

MISSING.—Balcombe-Brown, Maj. R., R.A.F. (S.R.) and R.A.F.; Humphrey, Sec. Lt. F. A., R.W. Surr., attd R.A.F.; Knight, Sec. Lt. W. H. D., R.A.F.; Lane, Lt. L. C., R.A.F.; Rowe, Lt. R. R., R.A.F.

Reported June 1st.

KILLED.—Carr, Sec. Lt. H. G., R.A.F.
Dillon, Sec. Lt. E. J., R.A.F.
Dixon, Flt.-Sub-Lt. H., R.A.F.
Meredith, Lt. E. M., R.A.F.
Pauline, Sec. Lt. V. R., R.A.F.
Sanders, Lt. F. J., R.A.F.
Smith, Lt. S., R.A.F.
Stevenson, Sec. Lt. A. M., R.A.F.
Tate, Lt. A. C. R., R.A.F.
Taylor, Flt.-Sub-Lt. J. H., R.A.F.
Williams, Capt. W. H., Lanc. Fus. and R.A.F.

DIED OF WOUNDS.—Aitchison, Lt. D. J., E. Anglian R.F.A. and R.A.F.
Archibald, Capt. M. S. E., R.E., attd. R.A.F.
McKerrell, Lt. W. A. S., R. Scots and R.A.F.
Mitchell, Lt. J., Sco. Rif. and R.A.F.
Ramsden, Sec. Lt. S., R.A.F.

WOUNDED.—Bankes, Sec. Lt. P. A., R.W. Kent. R., attd. R.A.F.; Bowen, Sec. Lt. C. S., R.A.F.; Brown, Sec. Lt. F.G., R.A.F.; Cocks, Sec. Lt. L. F., R.A.F.; Donald, Lt. R. B., R.A.F.; Gauntlett, Lt. F. E., R. Berks R., attd. R.A.F.; Ganzalez, Sec. Lt. W. F., R.A.F. Lye, Cec. Lt. R. G., R.A.F.; Mackenzie, Lt. W. J., R.A.F.; Morgan, Lt. A. M., R.E., attd. R.A.F.; Penny, Sec. Lt. G. A., R.A.F.; Redler, Sec. Lt. H. B., R.A.F.; Reed, Lt. D. L., Sher. For., attd. R.A.F.; Rushton, Lt. H. T., R.A.F.; Sumsion, Lt. W. L., R.A.F.; Whiteside, Sec. Lt. H. L., R.A.F.; Whittington, Sec. Lt. L. M., R.A.F.

MISSING.—Bollins, Sec. Lt. A. V., King's (L'pool R.), attd. R.A.F.; Dolan, Lt. H. E., M.C., R.A.F.; Handley, Sec. Lt. J., R.A.F.; Holiday, Lt. R. A., R.A.F.; Scott, Lt. R., Lond. R. (T.F.), attd. R.A.F.; Tylor, Sec. Lt. C. E., R.A.F.

Reported June 3rd.

KILLED.—Atherton, Lt. F. W., M.C., R.F.A., attd. R.A.F.
Benson, Sec. Lt. R. C., R.A.F.
Blatherwick, Sec. Lt. W. G., R.A.F.
Chisholm, Lt. R. J., R.A.F.
Geidt, Lt. C. U., R.A.F.
Greenall, Capt. J. E., D. of Lancaster's Yeo., attd. R.A.F.
Hughes, Lt. W. B., R.A.F.
Lefeuvre, Sec. Lt. W. E., R.A.F.
Levine, Sec. Lt. M. J., R.A.F.
Milburn, Sec. Lt. C. L., R.A.F.
Miller, Sec. Lt. J. J., R.A.F.
Smuts, Sec. Lt. C. L., R.A.F.
Stack, Sec. Lt. J. C., Labour Corps and R.A.F.
Terry, Sec. Lt. E. C., R.A.F.
Wilkinson, Sec. Lt. C. B., R.F.A. (S.R.), attd. R.A.F.

WOUNDED.—Batchelor, Capt. T. A., R.A.F.; Bursey, Lt. J., R.A.F.; Carter, Sec. Lt. R. A., Yorks R., attd. R.A.F. Cooke, Sec. Lt. T. R. G., E. Kent R., T.F., attd. R.A.F. Fitzherbert, Lt. J. A., R.G.A. (S.R.), attd. R.A.F.; Gibbs Capt. H. M., R.A.F.; Hyson, Sec. Lt. J. E. R., R.A.F. Lister-Kaye, Capt. K. A., W. Yorks R. and R.A.F.; Lomax Lt. A., R.F.A., attd. R.A.F.; MacLachlan, Lt. R. J. R.A.F.; Mitchell, Sec. Lt. J. H., R.A.F.; Sanders, Sec. Lt. J. B., R.A.F.; Savage, Lt. G. R., R.A.F.; Spoonley, Lt. H. K., R.A.F.; Waterworth, Sec. Lt. A., R.A.F.; Woodman, Sec. Lt. H. S., R.A.F.

MISSING.—Andrew, Sec. Lt. W. L., R.A.F.; Bell, Lt. E. V. R.A.F.; Birkhead, Lt. J. B., W. Yorks R., attd. R.A.F. Sinclair, Sec. Lt. L. R., R.A.F.

Reported June 4th.

KILLED.—Allen, Capt. J. A. M., R.A.F.
Barker, Sec. Lt. J. C., R.A.F.
Burdett, Sec. Lt. W. R., R.A.F.
Forster, Sec. Lt. C., R.A.F.
Gillespie, Sec. Lt. A. E., R.A.F.
Heard, Lt. E. T., R.A.F.
Jackson, Sec. Lt. C. F. S., R.A.F.
McFarlane, Sec. Lt. D. M., Sco. Rif. and R.A.F.
Mitchell, Sec. Lt. E. P. H., Bord. R. and R.A.F.
Stewart, Sec. Lt. A. R., R.A.F.
Thorne, Lt. A. B., R.A.F.
Thornton, Sec. Lt. P., R.A.F.
Watson, Sec. Lt. H., R.A.F.

DIED OF WOUNDS.—Townsend, Sec Lt. W. H.
Walker, Sec. Lt. F. F., R.A.F.

WOUNDED.—Arnison, Lt. C. H., R.A.F.; Bevan, Sec. Lt. A., R.A.F.; Clark, Lt. B. D., R.A.F.; Cooper, Sec. Lt. T. C., M.C., R. Lan. R., attd. R.A.F.; Faber, Capt. C., R.A.F.; Fitton, Sec. Lt. R., R.A.F.; Holding, Sec. Lt. B., R.A.F.; Holmes, Sec. Lt. H. W., R.A.F.; Hughes, Sec. Lt. D. W., R.A.F.; Hunter, Sec. Lt. G. A., Dorset R. (T.F.), attd. R.A.F.; Mountain, Lt. G. A., R.G.A. (S.R.), attd. R.A.F.; Nangle, Sec. Lt. H. C. M., R.A.F.; Sainsbury, Lt. H., E. Lanc. R. (T.F.), attd. R.A.F.; Stewart, Sec. Lt. R. D., S. Staffs (T.F.), attd. R.A.F.; Stock, Sec. Lt. F. H., R.W. Kent. R., attd. R.A.F.; Wood, Lt. E. S., Sher. For., attd. R.A.F.

MISSING.—Chambers, Capt. W. G., Linc. R., attd. R.A.F.; Crabbe, Sec. Lt. H. L. B., K.O. Huss., attd. R.A.F.; Lamont, Sec. Lt. W., R.A.F.; Slinger, Sec. A., R.A.F.; Wilson, Lt. H. B. B., Glas. Yeo. (T.F.), attd. R.A.F.

* * *

CASUALTIES AMONG N.C.OS. AND MEN OF THE R.A.F. THE DATES ARE THOSE OF THE OFFICIAL LISTS

KILLED.

MAY 22nd.—Middleton 65056 2nd A/M J. (Golder's Green, London); Maisey 407072 Serjt. B. J. (Ogbourne St. George, Marlborough); Whitehead 5521 Cpl. G. (Gorton, Manchester).

MAY 23rd.—Mason 33107 2nd A/M A. W. (Tooting, S.W., London); Parker 8861 1st A/M J. (Sydenham, S.E., London); Whiteley 6237 1st A/M J.W. (Armley, Leeds).

MAY 24th.—Hooper 10234 2nd A/M O. (N. Kensington); Woodward 115311 3rd A/M C. E. (Liverpool).

MAY 25th.—Allison 4947 1st A/M W. H. (Leeds); Bliss 115422 2nd A/M T. R. (Sherborne); Dunkley 13776 1st A/M H. W. (Palmer's Green, London, N.); Hamer 6161 Serjt. J. H. (Radcliffe); Park 104534 3rd A/M T. R. (Askam-in-Furness); Ritchie 122878 2nd A/M G. (Bishopbriggs, Glasgow).

DIED OF WOUNDS.

MAY 17th.—Cannon 106064 3rd A/M T. (Edinburgh).

MAY 22nd.—Ryder 58063 2nd A/M R. A. (Tottenham, London).

MAY 23rd.—Brown 403389 2nd A/M R. (Govan, Glasgow); Devine 120003 3rd A/M P. D. (Dundee).

MAY 24th.—Anthony 101922 2nd A/M H. F. (Wickham Market, Suffolk); Thurgood 50277 1st A/M W. R. (Much Hadham, Herts).

MAY 25th.—Boxall 23399 1st A/M A. (Mildmay Park, London, N.); McLennan 50481 2nd A/M A. (Letter Kenny).

PREVIOUSLY REPORTED WOUNDED, NOW REPORTED DIED OF WOUNDS.

MAY 23rd.—Burton 108852 Serjt. A. (Tranmere, Birkenhead).

DIED.

MAY 22nd.—Brooker 26519 2nd A/M T. E. (Fulham, London).

MAY 23rd.—Dewhurst 87102 2nd A/M J. (Blackburn).

MAY 24th.—Shubrook 241592 2nd Cpl. G. K. (Great Missenden, Bucks).

WOUNDED.

MAY 17th.—Alston 403412 Cpl. G. T. (Hammersmith, London); Aldridge 42697 Cpl. A. L. (Harrow, London); Bailey 59399 2nd A/M W. E. (Daventry); Clarke 55129 3rd A/M F. N. (Forest Gate, London); Coxhead 42700 2nd A/M G. (Richmond, Surrey); Edwards 407023 3rd A/M S. (Griffithstown, near Newport); Foster F/11691 2nd A/M A. (Halton, near Leeds); Fletcher 80049 3rd A/M W. (Liverpool); McFarlane 105868 3rd A/M A. (Glas-

SANKEY

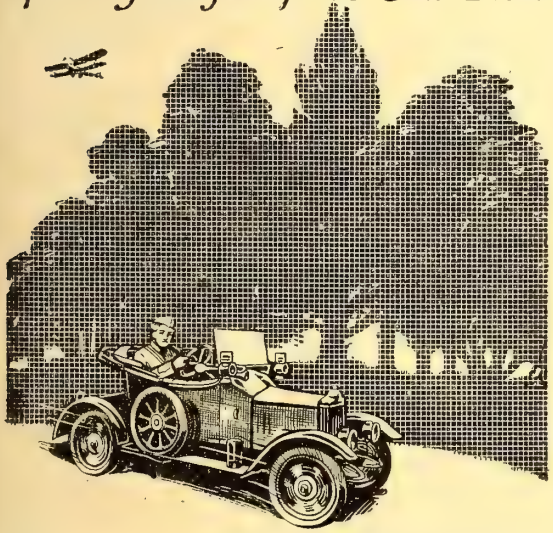
Undershields & other Light Stampings for Aeroplanes

Any size or weight: Rough or Machined: Single piece or Combination pressed and welded by Oxy-acetylene and other processes.

JOSEPH SANKEY & SONS Ltd

Hadley WELLINGTON, Shropshire.

Specially designed for the Owner-Driver



Your name and address now will ensure your receiving details of our post-war Models immediately they are available.

The All British **Standard** Light Cars

The STANDARD MOTOR Co., Ltd., Coventry.

London Agents:—The Pytchley Autocar Co., Ltd., 216, Gt. Portland Street, W.1.

THE

The Prestwich FLUID Gauge

Accuracy to the ten-thousandth part of an inch with ease

is a

MICROMETER

in which the

Sense of Touch

is

ELIMINATED

An ERROR of $\frac{1}{1,000}$ of an inch is

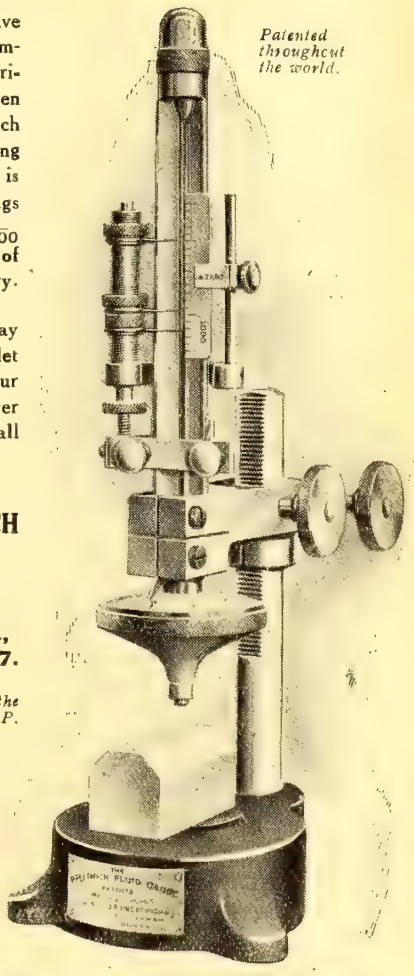
VISIBLE

to the naked eye as 1"

The Prestwich Fluid Gauge is a profitable investment for use in all factories engaged on repetition work to fine limits.

Hundreds of users have been surprised at the simplicity to which their intricate gauging has been reduced. The Prestwich Gauge has no wearing parts, skilled labour is not essential, and readings can be taken to the $\frac{1}{50.000}$ part of an 1" at the rate of 60 per minute if necessary.

Why not write us to-day for our illustrated booklet and let us know your requirements whatever they be? We have all kinds of adaptations.



Patented throughout the world.

J. A. PRESTWICH & CO., Northumberland Park, TOTTENHAM, LONDON, N. 17.

Manufacturers of the World-famous J. A. P. Engines.

Agents and Manufacturers for U.S.A. and Canada:—

The Coats Machine Tool Co., 30, Church Street, New York.

gow); Porter 21410 Cpl. E. W. (Harringay, London); Sittfall 82586 3rd A/M D. (Easton-in-Goldano, near Bristol); Tompkins 43283 2nd A/M R. T. (Dollis Hill, London).

May 22nd.—Burgess 46126 1st A/M C. H. (Downham Market); Bottom 44981 1st A/M R. A. (Wood Green, London); Doodson 15212 Serjt. F. (Crumpsall, Manchester); Ford 9162 Act. Cpl. R. J. (Bristol); Giles 9237 1st A/M A. E. (Putney); Heesom 50774 2nd A/M S. E. (East Dulwich, London); Humphreys 18976 1st A/M G. J. (Clapton, London); Houghton 402839 2nd A/M H. (Patricroft, Manchester); Jones F. 30424 S. (Aston, Birmingham); Mann 43689 2nd A/M J. H. C. (Derby); Parkinson 75327 2nd A/M H. (Lancaster); Philpott 65748 Cpl. H. (Gloucester); Webb 99625 2nd A/M M. V. (Herne Hill, London).

May 23rd.—Cobban 99478 2nd A/M W. (Fetternear, by Inverurie); Dougherty 12106 1st A/M J. G. (Thornton Heath); Gibbons 114742 3rd A/M J. (St. Helens, Lancs.); Gudgeon 7546 1st A/M P. E. (Derby); Hicks 990 2nd A/M C. (Ipswich); Newton 48792 1st A/M D. W. C. (Finsbury Park Road, London, N.); Ryan F. 38454 Serjt. J. J. (Newton, Sydney, N.S.W.); Skinner 7532 1st A/M G. W. E. (Bow, London, E.); Taylor 13749 1st A/M W. (New North Road, London); Wilson 43523 1st A/M F. (Bradford); Williams 62010 2nd A/M A. E. (Bermondsey); Whitaker 56219 3rd A/M F. (Skipton).

May 24th.—Atkinson 405176 3rd A/M M. W. (Goole); Archer 19227 1st A/M A. J. (Tottenham, London); Bellamy 57693 2nd A/M H. (Great Dover Street, London, S.E.); Booker 27983 1st A/M G. (Kingsway, London, W.C.); Herbert 43395 2nd A/M H. C. (Mansfield, Notts); Murray 50483 2nd A/M J. F. (Queenstown); Wilson 135301 3rd A/M W. C. (Glasgow).

May 25th.—Donaldson 402075 2nd A/M J. (Larchie); Fryer 77510 2nd A/M C. (South Kensington); Lodge 2210 F/Serjt. G. R. (Ferrybridge); Nutter 106769 2nd A/M T. C. (Liverpool).

Missing.

May 23rd.—Finney 77937 1st A/M F. (Hinckley).

May 25th.—Lane F/15788 Pte. A. J. (New Malden).

PERSONAL NOTICES.

NAVAL.

Engagements.

BRIGGS—LONG.—An engagement is announced between Col. Edward Featherstone Briggs, D.S.O., R.A.F. (late Wing Comdr., R.N.), second son of the late William Briggs, of Clifton, Bristol, and Violet, only daughter of Mrs. Ernest Long, of York, and grandchild of the late Edwin Long, R.A.

PORTER-COLT—GARDINER.—An engagement is announced between Flt.-Lt. S. Porter-Colt, R.N., eldest son of Mr. Colt, California, and Kathleen, widow of the late Maj. E. Gardiner, R.E., and youngest daughter of Charles Adams, South Africa.

Marriage.

WRIGHT—GIRLING.—On May 25th, at the Pro Cathedral, Bristol, Flt.-Lt. Cyril Victor C. Wright, R.N., eldest son of Dr. Clarence A. Wright and Mrs. Wright, R.N., of Leytonstone, was married to Laura Ellinor, eldest daughter of Mr. and Mrs. Girling, Bromley, Kent, by the Very Rev. Canon Lee.

Birth.

SAMSON.—On May 29th, at 6, Brandon Terrace, Great Yarmouth, the wife of Group Commander Colonel Charles Rumney Samson, D.S.O.—of a daughter.

* * *

On June 1st at Flushing the funeral of Flt. Sub.-Lt. Eric J. E. Buckley took place with military honours. Sub-Lt. Buckley's body was washed up on the coast of Holland last November, and had been temporarily interred where it was found.

MILITARY.

Deaths.

HEARD.—Lt. Edward Terence Heard, R.A.F., whose death was announced last week, was, previously to the war, employed in rubber planting in Bahr-el-Ghazal, Southern Sudan, and also in Government work. On the outbreak of hostilities he joined 2nd King Edward's Horse as a trooper, proceeding to France early in 1915 and receiving his corporal's stripes for gallantry in the field. He joined the R.F.C. in March, 1917, taking his wings in August of that year, since which date he was employed as a ferry pilot.

LAVARACK.—Maj. P. J. Vaughan Lavarack, M.C., R.A.F., who was killed in a flying accident on May 15th, was the fourth son of the late Hamlet Lavarack and Mrs. Lavarack, of 15, Wycombe Gardens, Golders Green, and husband of Lily Lavarack (*née* Gibson).

LODER-SYMONDS.—Capt. William Crawshay Loder-Symonds, Wiltshire Regt., attd. R.A.F., who escaped from Germany about 10 weeks ago, having been a prisoner of war since August, 1914, was killed in a flying accident early on May 30th. He was the fourth and second surviving son of Capt. and Mrs. F. C. Loder-Symonds, of Hinton Manor, Berks, four of whose five sons have now given their lives for their country in this war.

Capt. Loder-Symonds, who was born in August, 1886, received his commission in the Wiltshire Regt. from the Militia in May, 1908, and was promoted captain in Oct., 1914. He was taken prisoner on August 24th, 1914, after being wounded in the thigh at Le Cateau, and was one of the first officers to be eligible for internment in Holland. He declined to give his parole, and was sent to Schweidnitz, in Silesia. On his return to this country he was received by the King at Buckingham Palace. Capt. Loder Symonds married, on April 6th last, Melloney Mary, elder daughter of Capt. and Mrs. W. H. Waring, of Beenham House, Berkshire.

MEDCALF.—Capt. James Harry Medcalf, M.C., D.C.M. Border Regt., attd. R.A.F., who was killed instantaneously as a result of an accident whilst flying on May 25th, was second son of Mr. W. Medcalf, of Denbury, Newton Abbot. He joined the Army in August, 1914, as a despatch rider, and was in France at the end of that month and saw continual service. Getting his commission early in 1915, he was attached to the Border Regt. He won his D.C.M. at Festubert. Transferring to the R.F.C. he obtained his "wings" very quickly, and was flying from 1916 onwards. Seriously wounded on Feb. 5th of this year, he had only just rejoined his squadron as an instructor. Capt. Medcalf was 23 years of age, and had the 1914 Star among his decorations.

MOND.—Lt. Francis L. Mond, R.F.A. and R.A.F., aged 22, killed in an air fight on May 15th, was the eldest son of Mr. and Mrs. Emile Mond, of 22, Hyde Park Square, and Grey Friars, Storrington, and nephew of Sir Alfred Mond, First Commissioner of Works. He was educated at Rugby and Cambridge, and, having received his commission in the Territorial Artillery in June, 1914, volunteered for service oversea on the outbreak of war.

In February, 1915, he joined the Royal Flying Corps, and in the following summer was employed on active service in France. Later he returned to England suffering from shock and concussion, resulting from a fall with his machine. He was in France again in January, 1916, but later on, being classed as temporarily "unfit for flying," he was attached to the R.F.C. staff at home for a period of 18 months, but returned to France in March of this year. On May 15th, while flying over the enemy lines, Mr. Mond was attacked by several enemy scouting machines, and both he and his observer were killed during the action. Their bodies were brought in at great personal risk by an officer in the front line who had witnessed the fight.

MORGAN.—Lt. Edward Percival Morgan, R.A.F., whose death was reported last week, was educated at Bedale School and Wye Agricultural College, on leaving which he emigrated to Canada. He was settled there at the outbreak of the war, and as soon as he was able to release himself from his engagements he enlisted as private in the Canadian Infantry. Subsequently he was transferred to the British Army and got a commission in the R.F.C. He was sent to the front last month.

PENDER.—Capt. W. G. Pender, M.C., R.F.C., who was reported missing on August 15th, 1917, has now been officially reported as killed on that date. Born on November 18th, 1886, he was the eldest son of Mr. and Mrs. John Pender, Onich, Great Bookham, Surrey. He was educated at Dollar Academy, Scotland, where he distinguished himself as a fine athlete, being in the first fifteen in 1903-1904 and 1904-1905. His play as a three-quarter back was unexcelled in Scottish school football in these years, and "Gordon Pender's tackling" is still a by-word at his old school. He was also champion long-distance runner in 1904 and 1905. On leaving school he studied engineering in Dundee, and in 1909 received the offer of an appointment in Rhodesia.

On the outbreak of war he returned to England, and obtained his commission in the Royal Flying Corps. He quickly gained his "wings," and saw much active service. He was noted as an extremely skilful pilot—reckoned amongst the first flight in the Service, and his bravery was in keeping with his skill. He was awarded the Military Cross for conspicuous bravery in connection with the Battle of the Somme. He was wounded in July, 1916, but refused to be sent home, insisting on remaining in hospital in France in order to rejoin his squadron at the earliest possible moment.

PHILLIPS.—Sec. Lt. Cecil Ivor Phillips, Gloucestershire Regt., attd. R.F.C., reported missing since October 27th, 1917, is now presumed to have been killed on that date. He was the eldest son of the Rev. E. I. A. Phillips, of 11, Pembroke Vale, Clifton, Bristol, and was 18 years of age. He was educated at Clifton College and Sandhurst, and he went to France in the summer of 1917 as a fighting scout, and was shot down while escorting machines about 10 miles over the German lines.

PRINCE.—On May 30th, in Kent, Lt. William Francis John Prince, London Regt., attd. R.A.F., who was accidentally shot from the air while bathing on May 30th, was 20 years of age.

THORNE.—Lt. Arthur Burrell Thorne, R.F.A., attached R.A.F., was killed on May 8th as the result of a collision in the air while engaged in instructing. Born in 1895, he was educated at Northaw Place, Hurst Court, Ore, and Haileybury College (Melvill). At Haileybury he was in the cricket eleven in 1912 and 1913. In 1914 he came from Canada, obtained a commission in October in the R.F.A., and went to France in February, 1915.

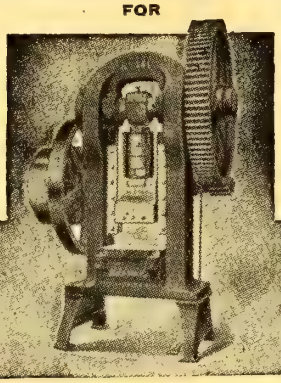
In May, 1916, he was attached R.F.C., and was flying in

BLISS

PRESSES & DIES
FOR

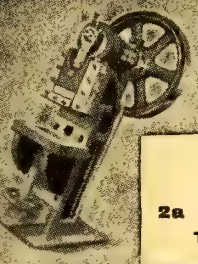
AEROPLANE

SEND YOUR STAMPING PROPOSITIONS TO US.



STAMPINGS

WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.





WRITE TO
E. W. BLISS CO.,
2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1
TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."

When the Guns cease to Roar



—and when our Manufacturing resources are no longer requisitioned by the Government, the Humber factories will resume the output of Cars which will more than maintain the reputation of the past.

HUMBER LIMITED,
COVENTRY.

France as observer and pilot for 11 months before he met with an accident that made him lame for life and kept him in hospital and convalescent home for seven months. Although at the time of his fatal accident he was unable to walk without crutches his capacity as a pilot was unimpaired, and he had a few days previously been passed again for general service. On his body was found an application to be sent to the front again on the first possible opportunity; he had intended to hand it that evening to his commanding officer.

WELLS.—Lt. Charles Douglas Wells, M.C., R.A.F., who was killed in action on May 16th, aged 21, was the only son of Mr. and Mrs. C. H. Wells, of The Manor House, Hempstead, near Stalham. He was educated at Banham Grammar School, and later at Gresham School, Holt, where he obtained his colours for cricket and football, was captain of his house, and a corporal in the school O.T.C. He obtained a commission in the King's Own Royal Lancaster Regiment in October, 1914, and went out to France in July, 1915. He served at Ypres, and took part in all the principal battles on the Somme, and later was present at the taking of Messines Ridge.

He was mentioned in dispatches in 1916, and was awarded the Military Cross at the end of 1917 for conspicuous gallantry in action and devotion to duty. Mr. Wells transferred to the R.F.C. in October, 1917, and went out to the front as an observer last January. His flight commander describes him as a magnificent shot.

WILBERFORCE.—Capt. William Sargent Wilberforce, M.C., 60th Rifles, attd. R.A.F., who was accidentally killed while flying on June 2nd, was the youngest son of the late Bishop of Chichester and Mrs. Ernest Wilberforce, of 17, Eccleston Square, S.W. He was 24 years of age. He received the Military Cross recently for bringing down an enemy aeroplane in Palestine. In March, 1917, he was appointed flight commander, and in January of this year he became an instructor in flying at the Central Flying School.

YEOMAN.—Lt. Bryan Frank Lawson Yeoman, R.A.F., who was accidentally killed while flying on May 11th, in his 22nd year, was the second son of Capt. E. W. Yeoman, of "Lauriston," Lee. He was educated at Highfield College, Leigh-on-Sea. On August 5th, 1914, he joined the 4th London Howitzer Brigade, and received his commission in the London Regiment in the following June. He served in Gallipoli, Egypt, and France, being wounded three times. Last September he transferred to the Royal Flying Corps.

ENGAGEMENT.

PALMER–WILLIAMS.—A marriage will shortly take place between Maj. L. Palmer, York and Lanc. Regt., attd. R.A.F., youngest son of Mrs. Palmer, Instow, Devon, and Miss Lillian Williams, youngest daughter of J. D. Williams, J.P., M.F.H., Clydach Court, Trealaw, S. Wales.

MARRIAGE.

McINTOSH—WEST.—The marriage arranged between Mr. F. Graham McIntosh, 60th Rifles and R.A.F., only son of Mr. J. Grant McIntosh and of Mrs. McIntosh, of Port of Spain, Trinidad, B.W.I., and Miss Margaret Marion Grace West, daughter of Mr. W. W. West, and of Mrs. West, of Needham Hall, Cambs., took place at St. Mark's Church, Friday Bridge, Cambs., on June 1st.

BIRTHS.

ANGAS.—On May 26th, at Kingston House, Farnborough, Hants., the wife of Lt. R. F. Angas, R.F.A., attached R.A.F. —of a son.

KNOWLES.—On May 29th, at Taverham Hall, Norwich, the wife of Capt. R. M. Knowles, M.C., R.A.F., of a son.

The relatives of Captain C. C. Clark, R.F.A., R.A.F., reported missing, have received a telegram stating that he is a wounded prisoner.

* * *

Mr. and Mrs. Sydney Begbie desire to return their sincere thanks for the kind sympathy which they received on the occasion of the death of their only child, Lt. Hamilton Begbie, 3rd E. Surr. Regt. and R.A.F., who was killed in action in France on April 21st.

AIR FORCE.

DEATHS.

BIRLEY.—Sec. Lt. T. E. H. Birley, R.A.F., was reported missing on March 22nd, but news has been received that he is a wounded prisoner of war at Stendal, Germany. It is significant that, although the young officer wrote his postcard on March 30th, it was not posted by the hospital authorities until May 3rd.

FARMER.—Sec. Lt. Archibald Onslow Farmer, R.A.F., who was killed while flying in Norfolk on May 30th, was the eldest son of Mr. and Mrs. Archibald S. Farmer, 7, Palliser Court, Kensington, W. He was 25 years of age.

FULLERTON.—Lt. Charles Fullerton, R.A.F., who was killed whilst flying on May 29th, was the second son of Mr. and Mrs. Fullerton, Noblethorpe, Barnsley. He was 22 years of age.

KNIGHT.—Sec. Lt. W. H. D. Knight, R.A.F., who was killed in action on May 2nd, was the eldest son of W. E. D. Knight, Limura, B.E.A., and grandson of W. Duncan Knight of Rapkyns, Horsham. He was 18 years of age.

SCOTT.—Lt. C. K. Scott, R.A.F., who was killed on June 1st as the result of an accident whilst flying in Kent was the elder son of Mr. and Mrs. H. K. Scott, of 42, Cheyne Court, London, S.W., and formerly of Twickenham, and Seawaren, N.J.

SHIELD and RYNEVELD.—A verdict of "Accidental Death" was returned at an inquest at Dartford on June 3rd on Lt. Frank Leslie Shield, R.A.F., and Lt. John Percival Ryneveld, R.A.F., who were killed in a collision in the air on June 2nd.

It was stated that the two machines were manœuvring independently at a height of 2,000 feet, when the under-carriage of one aeroplane struck the central part of the other and both nose-dived to earth. The pilots were killed instantaneously.

Lt. Hubert Griffith, R.A.F., said: "Both pilots were qualified and both were flying the same type of machine. I think the accident was probably caused by the sun being in the eyes of the pilots. They were practising fighting without any previous arrangement."

TRACEY.—Cadet Ernest Osborn Tracey, R.A.F., who was accidentally killed while flying in Wiltshire on May 31st, was the only son of Col. H. F. Tracey, C.F., N.Z., late Vicar of Dartmouth, and Mrs. Tracey, of North Ford, Dartmouth. He was 18 years of age.

WOOD.—Lt. Patrick Bryan Sandford Wood, R.A.F., who was accidentally killed on active service on May 24th, was the elder son of Dr. and Mrs. Charles Wood, Caius College Cambridge. He was 19 years of age.

ENGAGEMENTS.

BREMNER—HURD.—The marriage arranged between Capt. F. S. H. Bremner, R.A.F., and Vivyen, daughter of Mr. and Mrs. Archibald Hurd, will take place, leave permitting, on June 14th, at 2 o'clock, at All Saints' Church, Margaret Street.

MARIGOLD—MATTHEY.—A marriage has been arranged between James E. Marigold, R.A.F., son of J. A. Marigold, of 7 Augustus Road, Edgbaston, and Constance Joyce, only daughter of Mr. Richard D. Matthey, of The Croft, Hartley Wintney Hants.

MARRIAGES.

HEAD—GRANT.—On May 28th, Capt. J. Laurence Head R.A.F., was married by special licence to Peggy, youngest daughter of the late General Seafield Grant, Craigellachie Burley, New Forest.

PERKINS—FROST.—On May 29th, at All Saints' Church Oakleigh Park, N., Captain J. C. Perkins. R.A.F., only son of Mr. and Mrs. T. A. Perkins, of Heaton, Bradford, was married to Frances Marion, eldest daughter of Mr. and Mrs. A. C. Frost, Wollaston, Oakleigh Park, N., by the Rev. H. S. Miles M.A.

ROGERS—BRADFORD.—On May 25th at St. Barnabas' Church, Bristol, Harry Botwright Rogers, R.A.F., eldest son of Henry Thomas Rogers, of Tufnell Park, was married to Frances May Bradford, eldest daughter of the late Capt. Albert Sidney Bradford, R.N., and of Mrs. Bradford, of Bristol, by the Rev. T. R. F. Jeffreys, vicar.

BIRTHS.

HOLDER.—On May 27th, at Totnes, the wife of Temp. Capt. A. E. Holder, R.A.F.—of a daughter.

THOMAS.—On May 29th, at 26, St. Peter's Road, Croydon, Nora ((*née* Ebbutt), the wife of Lt. D. O. Thomas, R.A.F., of a son.

WHEATLEY.—On May 26th, 1918, at Calderfall, Kingsdown Road, Epsom, the wife of Captain C. W. C. Wheatley, R.A.F. —a son.

FOREIGN COMMUNIQUES.

FRANCE.

May 28th.—During the night of the 27th enemy aeroplanes were reported by the look-out posts at Rouen proceeding in a westerly direction. The alarm was sounded at 12.20. Violently attacked by anti-aircraft batteries, only one aeroplane succeeded in reaching the Rouen district. It dropped some bombs. One person was killed and four people were wounded. The "All clear" was sounded at 1.45.

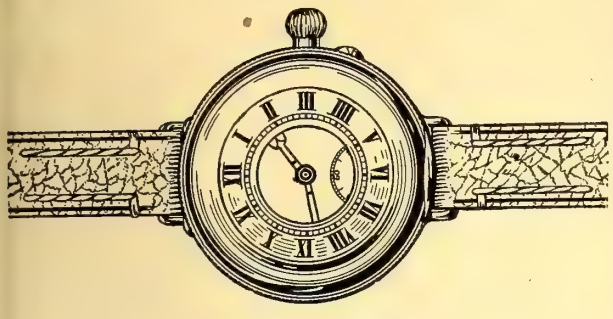
May 29th.—Army of the Orient.—An enemy aeroplane was brought down in flames by British aviators in the Vardar Valley.

May 30th.—"Yesterday evening the enemy displayed great aerial activity, and dropped bombs in various places behind the front. Some aeroplanes were reported to be making for Paris. The warning was given at 11.24, and our means of defence were put into action. No enemy machine passed the violent artillery barrage or flew over Paris. Some bombs were dropped in the outskirts.

"An enemy aeroplane was hit by our anti-aircraft batteries and fell in flames. The 'All Clear' was given at 12.34."

May 30th.—Our aviators have participated in the battle with endurance and daring beyond all praise. Our crews have fought

JEWELLERS BY APPOINTMENT SILVERSMITHS



Patent No. 11376/15.

THE "MILITARY" LUMINOUS WATCH.

A THOROUGHLY reliable and practical luminous watch, indispensable for Naval or Military Service. The "Military" Luminous Watch is the only Screw Case Silver Watch fitted with a "hunter" cover, and is the exclusive patent of The Goldsmiths and Silversmiths Company, Ltd.

As Illustrated £4 12 6 THE Without Cover £3 15 0

GOLDSMITHS & SILVERSMITHS COMPANY LTD.
with which is incorporated The Goldsmiths Alliance Ltd. Est. 1751.

Only one address (no branches):
112, REGENT STREET, LONDON, W.

THE TIELOCKEN AIR-WARM

Burberry Weatherproof

Every Burberry Garment bears a Burberry Label.



lined throughout with lightweight Fur, is an impregnable safeguard for pilot or observer, maintaining luxurious warmth and healthful protection against rain or cold winds at all altitudes.

The design permits of exceedingly quick adjustment, as a single strap and buckle holds it smartly and well.

Complete R.A.F. Kits in 2 to 4 Days; or Ready for Use.

Service Weatherproofs.
During the War BURBERRYS Clean and Re-proof Officers' Service "Burberrys," Tielockens, and Burberry Air-Warms
FREE OF CHARGE.

Military or Naval Catalogue sent post free on request.

BURBERRYS Haymarket S.W. 1. LONDON
8 & 10 Bd Malesherbes PARIS; also Provincial Agents

The Guardian Angel Parachute



RELIABILITY FIRST SECOND ALL THE TIME

E. R. Calthrop's Aerial Patents, Ltd.
Eldon St. House, Eldon Street, London, E.C.2
Telephone (2 lines)— LONDON WALL 3266 & 3267.
Telegraphic Address— "SAVEMALIVO, AVE, LOND ON

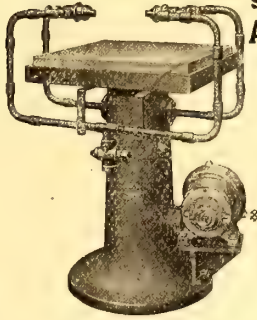
WAY Alldays

"EMPIRE" GAS FIRED BRAZING TABLE

For use in the construction of Aeroplanes.

This Table is so arranged that a centre flame is obtained which is specially useful for local heating, Brazing, etc.

For all particulars write to



Sole Makers
Alldays & Onions Co. Ltd.
BIRMINGHAM
And at
58, Holborn Viaduct,
LONDON, E.C.1.

against an enemy force which is very aggressive and very numerous. Flying low they attacked enemy troops with their machine-guns, they have carried out reconnaissances far into the enemy lines, and they have played an important part in maintaining communication.

During May 27th, 28th and 29th 19 German aeroplanes were destroyed in air combats. In addition, two captive balloons were brought down in flames, and 23 enemy machines were compelled to land badly damaged.

Our bombing machines during the night of May 27th-28th dropped 23,000 kilogrammes (23 tons) of explosives on the bridges and crossings of the Ailette and the Aisne and on the cantonments of Guignicourt and Juvincourt. During the following night and day they dropped 37,000 kilogrammes (37 tons) of projectiles on convoys and troops on the march and on the stations of Laon, Fismes, St. Gilles, etc.

Severe explosions and fires were observed in the stations of Fismes, Laon, and Coucy-les-Eppes. A munitions depôt blew up in Fismes.

Between May 27th and 29th six German aeroplanes were brought down by our anti-aircraft defences.

May 31st.—Some hostile aeroplanes crossed the lines yesterday evening and flew towards Paris. Signalled by our observation posts they were at once shelled by our defence batteries. The warning was given at 10.59 and the "All clear" at midnight. Some bombs were dropped in the Paris region, but no victims have been reported.

Army of the Orient.—In spite of bad weather, the Aviation Service took an active part in the battle, firing with machine-guns from a low height on the Bulgarian reserves. The aviators also successfully bombed the stations in the valley of the Vardar and the aerodrome of Hudovo.

June 2nd.—During the daytime on May 31st the aerial struggle continued on the whole battle front. Our crews, with their customary dash, attacked the enemy's aircraft, 23 of which were shot down and 14 seriously damaged.

The enemy's captive balloons, harassed without respite and in many cases forced to land, were considerably hindered in their work of observation. Six of them were destroyed.

Our observers did not cease to mark out the lines and to keep the Command informed in regard to the enemy's movements, carrying out reconnaissances day and night as far as Vervins, Guise, Le Cateau, and Hirson.

In the battle zone our squadrons machine-gunned the German troops on the march and caused them serious losses.

Our bombing aeroplanes gave proof of similar devotion and marvellous endurance. In the daytime on May 31st and during the following night, 66 tons of projectiles were dropped on the troops, transport, railway stations, and aviation grounds of the enemy, and, in particular, in the valley of the Aisne, on Fismes, Fère-en-Tardenois, Oulchy le Château, St. Gobain Forest, etc. Certain crews made as many as three expeditions on the same night. The results observed were very satisfactory.

Two German aeroplanes were shot down by the anti-aircraft defences during the daytime on the 31st.

Army of the Orient.—Allied aviators carried out with success numerous bombardments of stations and camps in the Vardar Valley. An enemy machine was brought down to the west of Ghevgeli.

June 3rd.—Our Air Force continued to display great activity during the days of June 1st and 2nd, carrying out, with its usual dash, its mission of reconnoitring, observation, and pursuit.

Twenty-nine German aeroplanes were shot down and 24 driven down out of control and forced to land. In addition, four captive balloons were set on fire.

Our bombarding squadrons multiplied their expeditions on the whole zone of the battle front. One hundred and thirty tons of explosive were thrown on enemy convoys, troops, assembly centres, and bivouacs, especially in the region of Crouy, Soissons, Vierzy, Villers-Helon, Neuilly-St. Front, La Fère-en-Tardenois, etc.

During the days of June 1st and 2nd four other enemy machines were destroyed by anti-aircraft fire.

Army of the Orient.—Allied aviators dropped over five tons of explosives on the railway stations in the Vardar valley and on the enemy's camps north of Huma and east of Seres.

North-west of Doiran three British machines attacked 12 enemy monoplanes, and shot down four, two of which fell in flames.

GERMANY.

May 28th.—Ten Allied aviators dropped 13 bombs on Landau, in the Palatinate, which caused slight damage to the garrison headquarters and some private houses. Two women and one child were killed.

May 30th.—During the last three days our aviators brought down 38 enemy aeroplanes. First Lt. Berthold achieved his 29th aerial victory.

Lt. Roeth, during a flight from Dixmude to the south of Ypres, brought down in flames five enemy captive balloons.

June 1st.—In the last two days we shot down 36 enemy aero-

SMALL TOOLS FROM STOCK.

CHUCKS, DIE HEADS. VICES.

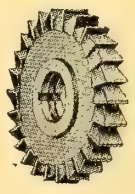
High Speed & Carbon Twist Drills



H.S. Taper End Mills.

MACHINE NUT TAPS.

DRILL CHUCKS



Milling Cutters, Side and Face Slotting Cutters, Slitting Saws.

TAPPING ATTACHMENTS



Hand Reamers

DIES.

MICRO-METERS.



SHELL REAMERS.

Taps, B.A., B.S.F., & Whitworth.

HACK SAWS, HIGH SPEED STEEL, Round & Square.

The SMALL TOOL SUPPLY Co., Ltd.

AVENUE CHAMBERS, SOUTHAMPTON ROW. W.C.1

'Grams—Prosait, West-Cent, London. 'Phone—2655 Museum.

NOTE.—LARGE STOCKS. PROMPT DELIVERIES.

J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.

Great Charles Street, Birmingham.

Metal Components

ABSOLUTE accuracy to design, careful finish and entire reliability are the points on which we concentrate in our production of sheet metal components for aircraft.

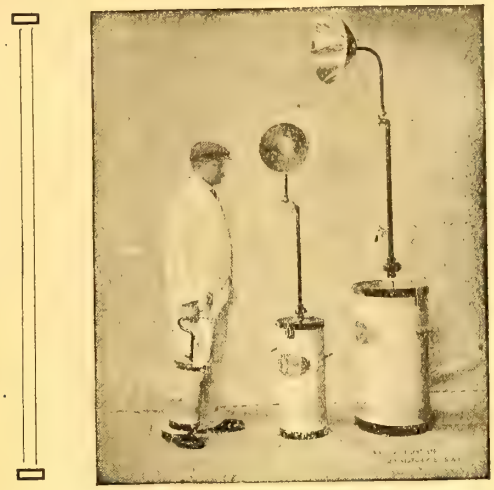
We make complete sheet metal components, riveted, sweated, brazed or welded, for R.E., F.E., B.E., S.E., De H.

:: :: :: ::

A.I.D. Examiners resident at our works.



British Metal (Kingston) Ltd.
Kingston-on-Thames. England



Large numbers of these three types have been supplied.

IMPERIAL LIGHTS
— FOR —
AERODROME LIGHTING

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

Telegrams— "EDIBRAC, PHONE, LONDON."

Telephone— VICTORIA 3540 (3 Lines)

Glue-pots
ELECTRICALLY HEATED.

Others are largely us ng these

—including the leading Aeroplane Factories, Munition Works, Woodworking Firms, Pattern Shops, Dockyards, Railways, Engineers, &c.

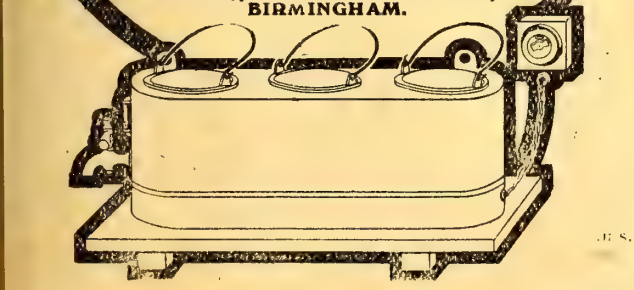
We undertake to promptly equip your works completely with every requirement in

SINGLE, DOUBLE or TRIPLE

Electrically heated Glue-pots. Cast-iron Vessels Solid Copper Water Bath with Water Level Gauge. The Regulating Sw tch permits the heat being applied and maintained at High, Medium or Low Temperatures as required. Made in all sizes.

Ask us to quote you for your needs.

PREMIER ELECTRIC HEATERS, Ltd.,
258-260, BRADFORD STREET, BIRMINGHAM.

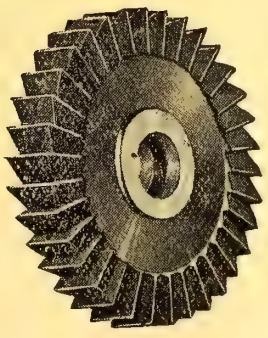


TWIST DRILLS



QUICK DELIVERIES.

MILLING CUTTERS



CENTRE DRILLS.

SEND US



YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,
32, Queen Victoria St., London, E.C.4.
'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.

planes. Lt. Meckhoff achieved his 28th aerial victory, Lt. Peutter his 25th, and Lt. Kroll his 24th.

June 3rd.—The railways leading towards the battlefield, which were strongly congested by the movements of troops, were successfully attacked by our bombing squadrons.

We shot down 31 enemy aeroplanes. Lieut. Meckhoff achieved his 29th and 30th aerial victories; Lieuts. Loewenhardt and Udet their 25th.

ITALY.

May 28th.—On May 25th our seaplanes effectively bombed the landing stages and hangars at Durazzo. Despite intense anti-aircraft fire and pursuit by enemy aeroplanes, all our machines returned to their base.

On May 27th the enemy made an air raid on Otranto, which was vigorously repulsed by our anti-aircraft guns. The bombs which were dropped caused no damage.

Very different was the result obtained the same day by an aerial attack by British machines on Durazzo. A torpedo-boat which was struck by a bomb capsized and sank, and a fire was observed near the Austrian aeroplane station.

May 30th.—In the morning of May 28th our seaplanes effectively bombed the military works at Durazzo and returned safely to their base.

Yesterday British aeroplanes bombed the enemy naval base of Cattaro, dropping there a ton and a half of explosives. One machine was lost owing to its being damaged, but the aviators were saved.

May 31st.—Aerial activity was intense; enemy trenches, dumps, and hutments were bombed on the Asiago and Lavarone (head of the Astico Valley) Plateaux, and columns of troops and transport were attacked with machine-gun fire on the roads leading to Gallio (north-east of Asiago). In air fights three enemy machines were brought down.

June 2nd.—Our own and Allied flights were very active; enemy aviation camps were bombarded with more than five tons of bombs. Five hostile aeroplanes were brought down in air fighting. A sixth machine hit by artillery fire fell to the left of the Piave.

June 3rd.—There was considerable aerial actvity on both sides One hostile machine was brought down.

U. S. A.

May 28th.—Early in the day our aviators shot down a hostile machine.

Royal Air Force



WE supply every requisite, in correct details, for the Royal Air Force. We illustrate the new R.A.F. uniform, correct in every detail and perectly cut.

Khaki Whipcord or Barathea Service Jacket Prices from £5/15/6

Slacks - £2/10/0

Cap, Badge, and Bar Complete - £1/15/0

Robinson & Cleaver Ltd.

156-168 REGENT ST., LONDON, W. 1.

Bowden Controls AND Cables FOR Aeroplanes

Suitable for all possible purposes. Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD., TYSELEY, BIRMINGHAM.

Tyseley

B.B.B.



on a "Belfast Roof" is an ideal covering for Hangars. Any width

UP TO 100 FEET CLEAR SPAN.

Outlasts galvanized iron, more equable temperature.

BRITISH & BEST

Write for Booklet "R."

49

D. ANDERSON & SON, Ltd., Lagan Felt Works, Belfast; and Roach Road Works, Old Ford, London, E.

W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

BLACK ENAMEL.

AEROPLANE GREY PAINT (flat) Oil and Petrol Resisting.

TRANSPARENT WOOD FILLER

Subject to A.I.D. Inspection.

HARLAND'S

VARNISHES, ENAMELS AND FINE COLOURS.

By Appointment to His Majesty the King

MERTON, LONDON S.W.19.

ESTABLISHED 1791.

COPAL VARNISHES for AIRSCREWS and EXPOSED WOOD PARTS, &c.

WHITE DOPE RESISTING PAINT

Subject to A.I.D. Inspection.

HEATING AND VENTILATION

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. Wire: "KINNELL-BOROH-LONDON."

CHAS. P. KINNELL & Co., LTD., SOUTHWARK ST., LONDON, S.E.1

AERO-PLANE STEEL PARTS

When requiring Aeroplane Parts write US — we can supply —

Tubes & Tubular Construction, Sheet Metal Pressed Parts, Wheel Rims, Special Sections in Steel, Brazing, Acetylene and Electric Welding, etc.

Any Special Parts made to order. Send your enquiries.

The LOMBARD Rim and Tube Co., Birmingham.

May 29th.—It is established that on May 27th our aviators shot down two hostile machines.

May 31st.—Early in the day our aviators shot down a hostile machine.

June 1st.—Our aviators shot down a hostile machine.

BELGIUM.

May 30th.—Two of our aviators brought down two German balloons in flames.

TURKEY.

May 27th.—Our aviators successfully bombed the enemy encampments at Wadi Hesi (north of Gaza).

In the Dardanelles there has been lively aeroplane activity on both sides.

May 28th.—Our aeroplanes again dropped bombs on the rebel (Arab) encampments on the Wadi Hesi (near the Hedjaz railway, east of the south end of the Dead Sea).

May 30th.—During the night of May 25th our seaplanes successfully and repeatedly attacked the enemy aerodrome on the island of Imbros. Several fires, which blazed for a long while, were observed.

BULGARIA.

May 26th.—East of the Tcherna there was lively aerial activity on the part of the enemy, and their aviators dropped bombs on one of our military hospitals, which was clearly visible, near the village of Molwitza.

May 30th.—West of the Vardar an enemy aeroplane was driven down in an air fight.

THE WAR IN REVIEW.

The Bombing of Karlsruhe.

The "Weser Zeitung" of June 2nd reports that at 9 o'clock on June 1st ten British aeroplanes attacked the "open town" of Karlsruhe and dropped bombs, killing four and severely wounding six persons. A number of persons were slightly wounded. Some houses were struck, apart from other material damage. Two British aviators were shot down.

A Possible Target.

Mr. H. Patrick Devitte the "Daily Express" correspondent at Geneva writes on June 3rd:—

Messages fom Cologne describe the Kaiser's visit to the battle front. The Imperial party travelled in two powerful armoured motor-cars, which were carefully camouflaged, as the German Higher Command holds the Allied aviators in great respect.

When the Kaiser climbed to the summit of the Winterberg he was without an escort, in order to escape the notice of enemy aviators.

Limelight.

Reuter's special correspondent with the American Army writes on May 30th:—

Lt. Campbell to-day protected a British aviator who was wounded while returning from a mission over the German lines.

When two enemy battleplanes attacked the wounded British aviator, Lt. Campbell dived between the German machines and their intended victim, and succeeded in escorting him back safely.

[It seems clear that the American Army in the field has yet to be schooled regarding the undesirability of allowing unofficial accounts of the performance of individual soldiers. Also that the American aviator needs schooling, for a machine-gun behind the German machines would have been a better protection for their intended victim than an aeroplane between.—Ed.]

Good Work in Italy.

An Italian semi-official communiqué of June 2nd, dealing with air warfare for May, says:—

Italian pilots and anti-aircraft batteries brought down 54 enemy aeroplanes and two captive balloons, whilst British aviators accounted for 82 machines and two captive balloons. The Italian and Allied losses due to hostile offensive action were only four chasing machines (two Italian and two British) which did not return.

Ten raiding operations were carried out, in which about 27 tons of bombs were dropped without the loss of even one machine brought about by the enemy. The British aviators almost daily carried out bombardment actions on the enemy lines, dropping altogether more than four tons of bombs.

The communiqué invites attention to the "imaginary victories" which the enemy reported on May 3rd and May 21st. In the first case three machines were said to have been brought down by an Austrian pilot. On that day the Italians lost one machine only, and this was forced to land in the enemy's lines owing to engine trouble. On the other hand, three enemy machines were brought down. In the second case, the Austrians reported that on the 19th four Italian aeroplanes had been brought down. No Allied machine, Italian, British, or French, was lost, but seven enemy aeroplanes were forced to land on the 19th.

OFFICIAL ACCEPTANCE TESTS

LAND MACHINES.

S.P.A.D.	*Avro*
Sopwith	*Armstrong-Whitworth*
B.E.	*D. H. 4.*
Short	*Handley-Page*
Curtiss	*Bristol*
Mann, Egerton	*Vickers*
M. Farman	*Nieuport*
H. Farman	*Supermarine, &c.*
Morane	

SEAPLANES.

Short, Sopwith, America Boats, F.B.A. Boats, Curtiss Boats, Norman-Thompson, A. D. Boats, &c.

Private Aerodromes Surveyed and Pilots' Reports Furnished.

DELIVERY AND EXPERIMENTAL FLIGHTS

ON LAND MACHINES & SEAPLANES.

COMPLETE REPORTS FURNISHED.

Rates on application to

THE PRODGER - ISAAC AVIATION COMPANY

(C. B. Prodger and Bernard Isaac),

166, Piccadilly, London, W.1.

Telephone: Gerrard **278** *(2 lines.)*

Telegrams: "Aeromnia, *Picc, London.*"

CLIFFORD B. PRODGER

J. LANKESTER-PARKER.

and other Pilots.

Approved Admiralty Pilots —for Acceptance Trials.—

INSURANCE.

WE are now in a position to quote low rates, through our brokers at Lloyd's, for the Insurance of Aircraft during ACCEPTANCE TRIALS AND DELIVERY FLIGHTS with an excellent and most comprehensive Policy. May we quote you for your new contracts?

SPECIAL ARRANGEMENTS with Sub-Contractors for HANDLEY-PAGE Type Land Machines or "AMERICA" Type Flying Boats

REPETITION WORK,

LIGHT PRESSINGS, STAMPINGS & PIERCINGS,

IN ALL METALS.

REYNOLDS BROS., 13-15, Branston St., BIRMINGHAM.

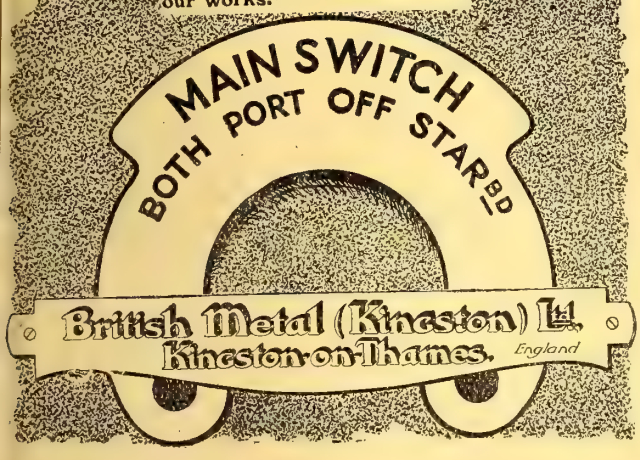
Plates to any Specification

—accurately made of the best materials, unaffected by climatic conditions engraved by us in any quantity.

We make in any metal, ivory, ivoroid and bone.

:: :: :: ::

A.I.D. Examiners resident at our works.



L'Hermetic

Sample Tin Gratis to Aero Engine Builders.



L'Hermetic filled joint is as impervious to any outside agency as is the surface of the metal itself.

L'Hermetic, which is a heavy liquid compound, dries immediately on application and impregnates the joint, making it air-tight, water-tight, grease-tight, dirt and dust proof. L'Hermetic is also heatproof and i soluble in all spirit, oil and fatty essences.

Extensively used by the French military authorities and by all the leading French aero engine manufacturers.

MESTRE & BLATGE,
20, Store Street, London, W.C. 1.
Telephone: Museum 1220-1. :: ::
Telegrams: "Mesblon, Westcent, London."
J. W. HAWKES, Manager.

COMPOSITION FOR AERO ENGINE JOINTS

Aeroplane Engine Manufacturers—
You can depend on ALVASTON perfect WELDING.

Pistons, Cylinder Jackets, Intricate Pipe Work, etc., in Steel, Copper, Aluminium, Cast Iron, and Alloys.

Our recently increased Capacity and Twelve Years' Experience are at Your Service.

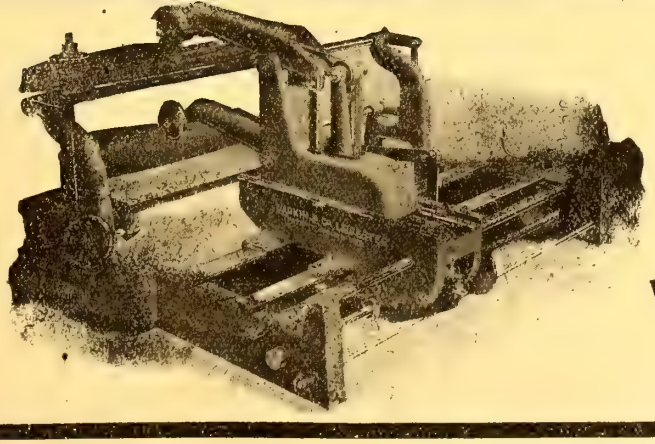
QUOTATION TO DRAWING OR SAMPLE. PROMPT DELIVERIES.

ALVASTON WELDING CO., ALVASTON, DERBY.

'PHONE—1 ALVASTON. 'GRAMS—"MOTORS, ALVASTON"

AUTOMATIC PROPELLER SHAPER K.E.

As supplied to all the leading propeller makers.



Every blade identical.

Less balancing required

Saves labour.

Increases output.

Write for list of users.

WADKIN & CO
LEICESTER.

Telegrams: "Woodworker."
'Phone: 3614/5.

MOSS-GEARING

AERO-ENGINE GEARING



Manufactured on principles ensuring greatest

STRENGTH AND ACCURACY.

GEARING—FLYWHEELS—CAMSHAFTS

R.A.F. PROPELLER BOSSES.

Our Aero parts are made in specially HIGH TENSILE STEEL, heat treated and all parts corrected for distortion.

TRANSPORT, LORRY & PLEASURE CAR GEARING

Bevel and Worm Drives accurately generated. Steering Worms and Sectors. Spur and Bevel Differentials. Gear Box Gears. Camshafts with guaranteed Glass-hard Cam Profiles.

-GEARING

THE MOSS GEAR CO., LTD.,

W. DUCKITT, *Managing Director* *Thomas St., Aston, BIRMINGHAM*

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.

PROMPT DELIVERY AGAINST "A" CERTIFICATE.



FIRST IN 1880 FOREMOST EVER SINCE.

The quickest drying and hardest Enamel manufactured

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,

NEW CROSS, LONDON, S.E.

R. F. & F. W. BROWN

(F. W. BROWN.)

Wollaton
Near Nottingham

ENGLISH ASH FOR AEROPLANES

Bent Timber Manufacturers.

Telephone .. 1526 Nottingham. Telegrams .. Browns, Sawmills, Wollaton.

A.G.S. WASHERS

Wire Work.

THIMBLES

Turn Buttons.
Eyelets.
Washers.

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,

51, 52, 53, PARK STREET, BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

THE varied uses and adaptations of The World Famous Bowden Wire mechanism and controls are recognised by almost every department of State Service. The war work which we have in hand for Home and Allied Governments precludes, for the present, our acceptance of private orders.

Established 1897.

Bowden Wire Ltd.

LONDON
VICTORIA ROAD
WILLESDEN JUNCTION, N.W.10

Godbolds.

HIGHGATE AIRCRAFT COMPANY LIMITED

NOTE:

Our Engineering Section can supply from stock Pressings for

AW., DH., RE., Etc.

Prompt delivery of Blankings or Fittings of any description guaranteed.

Capstan Work of any size up to 2 in. diameter and heavy Centre Lathe, Milling and Tool Turning undertaken.

QUOTATIONS ON RECEIPT OF DRAWING.

'Phone—2260 HORNSEY.

Pauntley St., Archway Road, HIGHGATE, LONDON, N.

PROPELLERS ONLY.

W. DODDY & Co.
LEEDS.

CONTRACTORS TO H.M. GOVERNMENT

S.B.A.C. SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Office—
Balm Road, Hunslet, Leeds.

Telephone—
24,214.
Telegrams—
Airscrews, Leeds.

Telegraphic Address: POETRY, 'PHONE LONDON.
Telephones: AVENUE 995, 996, 7996.

(Partners: H. W. PRITT, W. G. PRITT, P. W. SMALLWOOD, E. R. HILL),

PRITT & CO.

METAL WAREHOUSEMEN, MUNITION AND AERONAUTICAL CONTRACTORS

46, FENCHURCH STREET, LONDON, E.C. 3,

Where all communications must be addressed.

CITY WAREHOUSES: 62a & 64, Vine Street, Minories E.C.
DEPOTS: Paddington, Poplar, Shoreditch.

We hold good stocks, complying with Air Board, R.A.F. and Admiralty Specifications, of the following:

BRASS & COPPER in sheets, tubes, rod, wire, etc.
TINNED STEEL SHEETS.
MILD STEEL SHEETS, 9a.
BRIGHT DRAWN MILD STEEL BARS, 5a.
A. G. S. BOLTS, NUTS AND WASHERS.
COPPER RIVETS. TINMAN'S SOLDER.
SOLDERING IRONS.
BEST SWEDISH WELDING WIRE.
BRAZING SOLDER in wire and granulated Form.
SILVER SOLDER. WIRE GAUZE, &c.

All material passed A.I.D. before despatch.

DAILY DELIVERIES made by our own vans within a radius of 15 miles of our Warehouses.

NOTE.—All orders for Aeronautical Work receive especially prompt attention.

WE ARE BUYERS OF SCRAP BRASS & COPPER.

CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

CONTRACTORS TO H.M GOVERNMENT

W.T.CLARK & CO.



Telephone No. Central 2121.

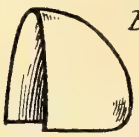
5, GREEN TERRACE, ROSEBERY AVENUE, LONDON, E.C.1.

Telegrams Etalspinne Isling London. Two Words.

METAL SPINNERS
and
SHEET METAL WORKERS
for Aeroplane Constructors

METAL SPINNINGS for AEROPLANES

Cowlings (COMPLETE SET)
Coverings
Undershields
Fairings
Petrol Tanks
Shields etc.

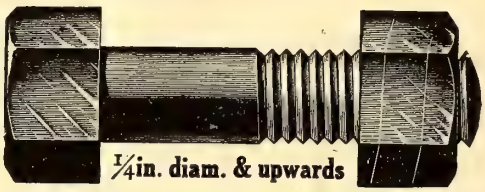


BEATEN COWLS OF EVERY DESCRIPTION

SPUN COWLS UP TO 48 INCHES IN DIAMETER.



BRIGHT BOLTS & NUTS



¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅜in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

THE
BRITISH WRIGHT
CO. LTD.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

Manufacturers of
AERONAUTICAL INSTRUMENTS
FOR
NAVY & ARMY AEROPLANES

Ogilvie Air Speed Indicators
For use on Aeroplanes, Airships, Kite Balloons and Air Stations.
Statoscopes.
Recording Manometers.
Wind Speed Recorders.

At present the Government is taking the entire output, but British and Foreign Firms are invited to place their orders now for delivery of Aeronautical Instruments after the war.

The BRITISH WRIGHT Co. Ltd.
33, CHANCERY LANE, LONDON, W.C.2.

The LARGEST and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12
Solo and Dual
Aeroplanes in USE. Over 20
other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE ROYAL AIR FORCE.
Particulars from BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.

"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS
BRITISH CELLULOSE & CHEMICAL MANF'G.
COMPANY, LIMITED,
Telegrams:
"Cellulate, London." 8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4045.*
Also at Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)

THE SIBERIAN & GENERAL TRADING CO., LTD.
Can supply from stock or for prompt shipment
PLYWOOD
IN ALL WOODS, SIZES AND THICKNESSES.
SPECIALITY: BOARDS FOR AIRCRAFT WORK.
HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

THE
"BOWSER" AEROPLANE SEATS
(Made to A.G.S. Drawing 264).
Supplied to the Royal Aircraft Factory and the Leading Aircraft Manufacturers.
EDWARD BOWSER, 50, Park Lane, Leeds. Tel. No.: Central 3473.
Under the A.I.D. Inspection.
Northern Representative—
Mr. WALTER M. DANIELL,
33, East Beach, Lytham.

STEEL WIRE STRANDS & CABLES
GEO. CRADOCK & CO., Ltd., WAKEFIELD.
London Office:
7, East India Avenue, E.C.3.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

Makers of Aeroplane Tanks and Cowls.
General Sheet Metal Workers.

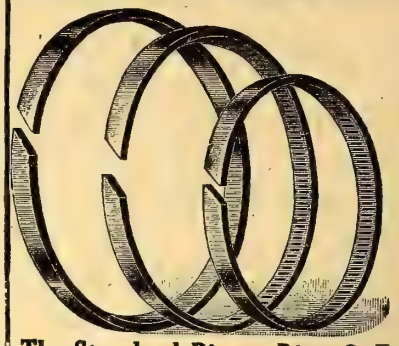
Zephyr Ventilating Co., Ltd.

VENTILATING ENGINEERS,
LYPPIATT ROAD, BRISTOL.

Speciality—High Efficiency Ventilation and Dust Removal Appliances.
Sole Proprietors of the "Pentarcomb" Patent.
We guarantee to meet the Factory Act Requirements.

Telephone—4383 Bristol. *Telegrams—Zephyr, Bristol.*

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.
Telephone No. 2149.
Telegrams—"Ocean," Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Don Road, Sheffield.

THE POOLE AVIATION CO.
POOLE, DORSET.

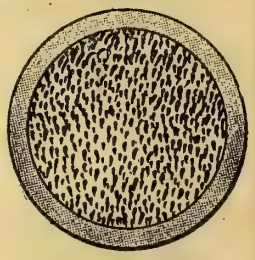
Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

ANTOL CASE HARD



Harden your Screws and Gauges with **ANTOL.**
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1.

HIDE GLUES ***FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.***

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.
Telephone: 4978 Avenue

Telephone—Works: East 3832, 3833. Offices: 3474 Gerrard. Telegraphic Address—"Extouboul, London."

THE STANDARD Aircraft Manufacturing Co., Ltd.

CONTRACTORS TO H.M. ADMIRALTY AND AIR BOARD.

Head Office: SAVOY HOUSE, Corner of Savoy Street, STRAND, W.C.2.
Also at 28, BOW COMMON LANE, LONDON. E.3.

EBORA PROPELLER Company 11 & 12 Surbiton Park Terrace KINGSTON on Thames Telephone KINGSTON 672 Telegrams EBORA, KINGSTON

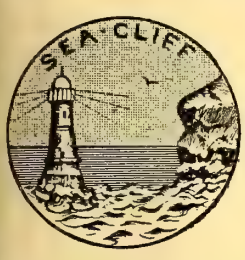
Ebora Propellers

Contractors to the Admiralty and War Office
SCHOOL PROPELLERS
FOUR BLADERS
SEAPLANE PROPELLERS
SLATE TABLES For PROPELLER WORKS

Lang Propeller LTD.

Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.

Manufacturers of
PHOSPHOR BRONZE,
GUN METAL,
MANGANESE BRONZE,
BRASS & COPPER,
TUBES, SHEETS, RODS, WIRE, AND
CASTINGS.
PHOSPHOR TIN, PHOSPHOR CO-PER.



CHARLES CLIFFORD & SON, LTD.,
BIRMINGHAM.

The Air Navigation Co., Ltd.
BLERIOT & SPAD,
ADDLESTONE (SURREY).
Contractors to War Office and Admiralty.
Flying Ground — Brooklands Aerodrome.
NORBERT CHEREAU, Managing Director,
Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

"FREMO" TAPER PINS
Why not allow us to carry all the responsibility which rests, and must rest, upon the taper pin?
We have given our product a name in order that we may do so. It is our way of proving the confidence we have in that which we made.
FREDK. MOUNTFORD (B'ham.) Ltd.
Lifford,
BIRMINGHAM.

Aluminium Castings
Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES
Contract to H.M. Government
Chill Castings for Aeroplanes a Speciality.
Telephones: 3846 City. 4879 Central. Telegrams: Krankases, Isling London
R W COAN
219, COSWELL ROAD, LONDON, E.C.
COAN CASTS CLEAN CRANK CASES

SALMSON AERO-ENGINES
(Canton-Unné System).
All enquiries should be addressed to
THE DUDBRIDGE IRON WORKS, Ld.
STROUD,
GLOUCESTERSHIRE.
London Office:
87, *Victoria Street, S.W.*1,

"CROID" LIQUID GLUE
as adopted by
H.M. Department of Aeronautical Supplies for Aircraft Construction,
THE IMPROVED LIQUID GLUES COMPANY, Ltd.
Great Hermitage Street, London, E.1.
'Phone: Avenue 3178. Tel.: Excroiden, 'Phone, London.

Aeroplane Steel Sheets
as supplied by us to
The Royal Aircraft Factory and leading Aeroplane Makers
Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")
BERNARD NICKLIN & CO.
SMETHWICK, BIRMINGHAM
Telegraphic Address: "Bernico," Birmingham. Telephone No.: 224 Smethwick.



TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

Advertising
For *GOOD* ADVERTISING consult Godbolds, 8, Breams Buildings, London, E.C.4. Estimates Free. 'Phone: City 5912. E. H. Godbold, Director
GODBOLDS

CITY OF LONDON AIRCRAFT.
Manufacture of COWLS, MANIFOLDS, TANKS, RADIATORS, SHEET METAL PARTS, AND COPPER PIPE WORK.
Offices: SPENCER STREET, ISLINGTON, N.1.

FREDERICK WARD,
Full Right Up With Machine Work,
CAN STILL UNDERTAKE PATTERNS AND SMALL HIGH-CLASS ASSEMBLIES, MACHINE PARTS TO BE SUPPLIED.
ALLSOP ST., UPPER BAKER ST., N.W.
'Phone—PADDINGTON 4743.

Clegg Metal Engraving Co.
Chatsworth Works, Worthing,
For Dials, Scales, Name-plates and Address Plates, and Instruction Plates, in Metal, Ivorine, Etc.
Either Chemically Engraved or Machined.

PEGAMOID BRAND LEATHER CLOTH.
The Best Waterproof Covering for Railway, Tramway, Aeroplane, Motor Boat, Cushions, Seats, etc.
Sole Manufacturers: NEW PEGAMOID LIMITED, 134, Queen Victoria St., London :: :: E.C.4.
Telegrams—Pegamoid, Phone, London. Telephone—City 9704 (2 lines). Cables A B C 5th Edition and Private.

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work. Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd., *Offices:* Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

Clean Coloured Rags
FOR CLEANING & WIPING.
Best and Cheapest for Munition Works :: Engineers, Printers & Bus Companies, etc.
A. JOSEPH, EARL STREET, LONDON ROAD, LONDON, S.E.1.
Telephones: Hop 83, 361 & 4272. "Cheaper than cotton waste."

BRAZING AND SILVER :: :: SOLDERING.
J. W. KING, 36, ST. JOHN'S SQ. LONDON, E.C.1.
TELEPHONE - - CITY 5238.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD., Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

SHENSTONE & Co., LTD.
AIRCRAFT DEP.
LEYTON.

AIRCRAFT PRODUCTION WITH MODERN METHODS.

E. KEITH DAVIES, General Manager. **Telephone: WALTHAMSTOW 24.**



MISCELLANEOUS ADVERTISEMENTS.

SPECIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS, in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per line. For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1.

PATENTS.

AGE & ROWLINGSON, Chartered Patent gents (Consulting Engineer, Mr. S. E. age, A.M.Inst.C.E.), 27, Chancery Lane, ondon, W.C. Tel. 332 Central.

enry Skerrett (H. N. Skerrett, A.I.A.E., .I.Mech.E., Associate I.E.E., Fellow of the hartered Institute of Patent Agents) Patents, esigns and trade marks.—24, Temple Row, irmingham.

nventors advised free. Write for booklet.—ing's Patent Agency, Ltd., 165, Queen 'ictoria Street, London. 30 years' references.

tanley, Popplewell and Co., Patent Agents nd Consulting Engineers. Applications for 'atents attended to in all countries.—38, Chancery Lane, W.C. Telephone: 1763 Central. Circular free.

Fletcher Wilson, Chartered Patent Agent, Registered United States Patent Attorney, High Street Chambers, Coventry.

SITUATIONS VACANT.

Wanted at once for work on Handley Page machines in aircraft factory, London, N.W., a number of aeroplane erectors and assemblers; engine nacelle assemblers, and viewers on final erection. There are also vacancies for sheet metal workers for petrol tanks and cowling, coppersmith for pipe work, and panel beaters. Full district rate and war bonus paid in all cases. No one on Government work or living more than 10 miles away will be engaged.—Write, Box No. 3556, THE AEROPLANE, 166, Piccadilly, W.1.

Aero Engine Fitters required, must be used to overhauling Gnome engines. Good wages paid. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3609, THE AEROPLANE, 166, Piccadilly, W.1.

Plane Assemblers wanted, immediate D.H. experience if possible. Fare paid. Flat rate and good shop bonus given. No one on Government work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3610.

Assistant Draughtsman required with aircraft experience, immediate. Good wages. Fare paid to the works, which are in South Wales. No one on Government work need apply.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3639.

Wanted Machinist for spindle and planing machines on aircraft work. No one on Government work will be engaged.—State age, experience, and wages required to your nearest Employment Exchange, mentioning this paper and No. 3624.

Foreman wanted for large final erection shop in aeroplane factory, London, N.W. Write, giving details of experience, age, and wages required. No one will be engaged who is on Government work or living more than 10 miles away.—Write, Box 479, Sells, Ltd., 168, Fleet Street, E.C.4.

First-class Woodworkers, thoroughly used to aircraft work, required by Government controlled establishment in London area. Top rate of pay for good men. No one already on Government work or residing more than 10 miles away will be engaged.—Box No. 3654, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted Foreman for engineers' shop working on small aeroplane parts. Must be live man, with plenty of push. S.E. London. No one engaged on Government work or residing more than 10 miles away will be engaged.—Box No. 3653, THE AEROPLANE, 166, Piccadilly, W.1.

A Large Factory in N.W. London, manufacturing machines of their own design, require a number of detail draughtsmen with first-class aeronautical experience. Exceptional opportunities and permanent positions offered to suitable men. No one at present engaged on Government work or resident more than 10 miles away need write to Box No. 480, Sells, Ltd., 168, Fleet Street, E.C.4.

Works Manager or **Good General Foreman** wanted immediately for firm engaged on aero engine work; one used to take complete charge, including estimating and cost. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3652, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted immediately for factory near London, Assistant Works Manager, with special experience in Sopwith machines. No one residing more than 10 miles away or engaged on Government work need apply.—Write, full experience, etc., Box No. 3645, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Buyer or Managing Clerk, 26, ineligible, desires responsible post; 10 years general engineers, aircraft radiators, and ironmongery. Thoroughly reliable, excellent references. Commercial and works office experience. London or suburbs preferred.—Box No. 3657, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.—continued.

Shop or General Foreman seeks engagement. First-class experience.—Apply, Box No. 3660, The Aeroplane, 166, Piccadilly, W.1.

Timber.—Appointment wanted as supervisor. Twenty years' exeperience buying, selection, and conversion of hardwoods and softwoods.—Box No. 3659, The Aeroplane, 166, Piccadilly, W.1.

Engineer, exceptional aircraft experience since 1909, seeks post as works manager, superintendent, or chief inspector. Good organiser.—Box No. 3655, The Aeroplane, 166, Piccadilly, W.1.

Advertiser, 35 years' practical experience in sheet metal department, fitting, and machine shop. Expert craftsman, open for engagement as works manager; prepared to consider any position where brains, skill, and hard work are essential and appreciated. Must be a firm of repute, building complete machines. London preferred.—Box No. 3651, The Aeroplane, 166, Piccadilly, W.1.

Manager of Propeller Works disengaged shortly desires position, similar or otherwise. Ten years' practical aircraft experience, designing and construction. 46. Has had excellent results in employment and teaching of female labour.—Box No. 3650, The Aeroplane, 166, Piccadilly, W.1.

Purchasing Man, experienced, seeks berth. Good correspondent. Well up in all markets. Just disengaged. Early reply.—Box No. 3649, The Aeroplane, 166, Piccadilly, W.1.

Foreman desires situation. Good knowledge of propellers and other woodwork; used to male and female labour. Good organiser. Excellent references.—Apply, Box No. 3647, The Aeroplane, 166, Piccadilly, W.1.

Assistant Works Manager desires situation; expert knowledge of machine shop practice, estimating, costing, and rate-fixing. Tool room and drawing office experience, aero engine, and aircraft metal parts. Nineteen years' sound experience. Good organiser, strict disciplinarian.—Box No. 3646, The Aeroplane, 166, Piccadilly, W1.

Wanted situation as foreman or under manager. Practical man, well up in propellers and other woodwork. Good organiser, used to male and female labour. First-class refs.—Apply, Box No. 3648, The Aeroplane, 166, Piccadilly, W.1.

Timber Inspector or Firm's Inspector desires engagement. Thorough and long experience in aircraft construction. Excellent references.—A. B., 119, Wilberforce Road, Finsbury Park, N.4.

Young Lady, aged 30, London aircraft experience, seeks engagement similar capacity. Good references.—"G.," care of 52, Stanger Road, South Norwood, S.E.25.

Erector desires engagement, finals, London district. Experienced all branches. Could take charge.—Box No. 3644, The Aeroplane, 166, Piccadilly, W.1.

FINANCE.

Late Managing Director of well-known Aeroplane Company is desirous of taking a financial and active interest or purchasing outright Aircraft Manufacturing business.—Box No. 3608, The Aeroplane, 166, Piccadilly, W.1.

PERSONAL.

L. Hall.—Please write Oaklands or Smithfield. Urgent.—Mater.

FOR SALE.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid.—Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Tarpaulins.—New waterproof khaki sheets for sale. Also second-hand railway truck sheets, repaired and redressed. London works.—For prices, etc., write Johnston, 12, Broughton Road, Croydon.

Enfield, 3 h.p., late 1915. Little used; perfect running order; including lamps and spares; also new side car for same. £48 all.—Gregg, 19, Clifford Road, East Finchley.

Overhand Planer, One Thicknessing Machine, and **Fourcutter** for sale.—Box No. 3658, The Aeroplane, 166, Piccadilly, W.1.

1914 French Palladium, property of officer, sporting two-seater; special engine; very fast; 27 m.p.g. guaranteed; mechanical overhaul just completed; car now in paintshop; electric lamps; sloping bonnet; discs; oversize tyres; photo; £240.—Box No. 3656, The Aeroplane, 166, Piccadilly, W.1.

HAULAGE.

Steam and Petrol Motor Wagons for Hire, for timber transport.—Apply, Silwood Storage Co., Ltd., 7, Victoria Street, Westminster, S.W. Telephone, Victoria 6882.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road, Manchester.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1.

Engineering Firm with well-equipped machine shops, now engaged on munitions, solicits inquiries for all classes of turning, drilling, grinding, milling, fitting, etc. Aircraft fittings, also copper pipe work, a speciality. Correspondence with a view to post-war business especially invited.—The Lankester Engineering Co., 39, Eden Street, Kingston-on-Thames.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially S air-dried timber as supplied to leading structors in Britain and the Continent. Spruce, Ash, Poplar; Hickory and Skids; Three-ply; Thin Cedar and Mah for Floats; Walnut for Propellers.—W Mallinson and Sons, Ltd., Hackney 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all ties, suitable for Aircraft Work. Delivery stock.—John MacLennan and Co., 30, gate Street, London, E.C.1. (See Adv ment Page II. of cover and Buyers' Gu

Aeroplane Seats. We can give quick de of cane seats, A.G.S. 264, or other pat guaranteed pass inspection. Write u anything required in cane work.—The W brook Company, Leicester.

MODELS.

Model Aeroplane, flies ¼ mile circular fl carriage paid, 3s. 6d. "I can thorou recommend your machines." Testim from Dr. Adams, Union Road, Shef Thousands satisfied, testimonials from parts.—Dept. C., Bristol Model Aero Depôt, Eastville, Bristol.

PUBLICATIONS.

"The Red Air Fighter," by Baron Von R hofen. Now ready, 2s. 6d. net, 2s. 9d. free.—The Aeroplane and General Publis Co., Ltd., 2, Bream's Buildings, E.C.

6th Revised and Enlarged Edition, with "Types of Aeroplanes" down to 1

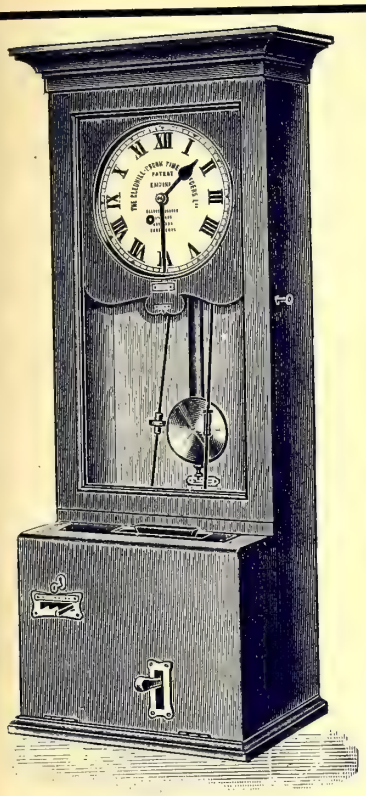
THE AEROPLANE SPEAKS,
By Capt. H. Barber, A.F.Ae.S.
Price, 7s. 6d. net.; 8s. post free.
McBride Nast & Co., 2, Breams Buildir E.C.

Just published. 360 *pp. with Illustrations,* 4½ *in.,* 6¾ *in., limp cloth, Price* 6/- *net (postage,* 4d.).

The Aviation Pocket Book for 191
By R. BORLASE MATTHEWS,
Assoc. M. Inst. C.E., F.Ae.S.
Containing data on Aeroplane Theory and Desig Air Pressure and Resistance, Structural Material Engines, Typical Aeroplanes, Piloting, Riggin Meteorological Data, Scouting and Signalling, etc etc. With Glossary and other information of valu to all interested in Aviation.

Prospectus on Application.
London: CROSBY LOCKWOOD & SON, 7, Stationers' Hall Court, E.C.





The Recorder which stamps the definite minute—

IN MANUFACTURE every effort is made to produce a reliable strong machine.

Only best materials are used and the Recorders are British throughout.

WE ARE SUPPLYING H.M. Government and Government Controlled Factories, also many Aeroplane Works.

"CONCERNING COSTS" FREE.

"PRACTICAL COSTING," By A. H. Gledhill, A.M.I.M.E. 3/- Post Free.

COMBINED TIME AND JOB CARD

for recording complete labour cost.

The **"IN"** and **"OUT"** time is recorded on the card, also the time when jobs are changed.

The TIME on the Job is cast out at the side of card and the total hours entered in the Job No. column under the Job number.

Unfinished Jobs are entered at the foot with Job number and the total hours worked up to the week-end under column headed "Carried Forward," and transferred to the next week's time card in the column "Brought Forward," any time worked on this job during the second week is entered in the column, "Time for this Week." If the job is completed during the second week, the total is added and entered in the "Jobs Finished" column. If the job is not completed, the total is entered in the column "Carried Forward," which will in turn be entered on the third week's time card.

STANDING ORDER NUMBERS for constantly recurring Non-Productive Jobs are represented on the card, e.g. K.31 Grinding Tools; E.53 Making a New Lathe Tool.

SYSTEM B.

CHECK No. 315.

WEEKLY TIME CARD.

Week ending 18 Aug. 1916

Name Thos Johnson

Job No.	IN—ON	OUT—OFF			
	5 59 SA 8 29 SA	12 01 SA			5½
1360	5 59 M 8 29 M 1 29 M	5 02 M			9½
	5 59 TU 8 29 TU 1 29 TU	5 01 TU			9½
32 HTS	5 59 W 8 29 W 1 29 W	3 00 W	32hrs	7½	
1510	3 00 W 6 00 TH 8 30 TH 1 29 TH	5 01 TH		2	9½
11½Hrs		5 00 TH	11½	9½	9½
K.31.	6 00 TH	7 00 F		1	
E53	7 00 F 8 29 F	10 00 F		2½	
1820	10 00 F 1 30 TH	4 00 TH		5	
1469	4 00 TH	5 00 TH		1	9½
		TOTAL FOR WEEK			53

Job No	Brought Forward	Time this Week	Jobs Finished	Carried Forward
1360	14	30	48	
1469				

THE GLEDHILL-BROOK TIME RECORDERS LIMITED.

26, VICTORIA STREET, LONDON, S.W.1.
Tel. Vict. 1310.

44, HILL STREET, BIRMINGHAM.
Tel. Midland 2086.

HUDDERSFIELD.
Tel. 1069.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

CONTRACTORS TO THE ADMIRALTY AND AIR MINISTRY.

SHORT BROTHERS,

ROCHESTER, KENT,

AND

BEDFORD.

Telephone —
627 CHATHAM
261 AND 262 BEDFORD
788 BATTERSEA.

Telegraphic Addresses:
"SEAPLANES," ROCHESTER
"SHORTS" BEDFORD.
"BALLOONING," LONDON.

London Office: WHITEHALL HOUSE, 29/30, CHARING CROSS, S.W. 1.

Telephone: 378 REGENT. *Telegrams*: "TESTE PHONE, LONDON."

EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for THE AEROPLANE AND GENERAL PUBLISHING CO., LTD., by BONNER & CO., The Chancery Lane Press, Rolls Passage, London; and Published by THE ROLLS HOUSE PUBLISHING COMPANY, LTD., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY, JUNE 12, 1918.

Vol. XIV. No. 24. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

John Dawson and Co. (NEWCASTLE-ON-TYNE), Ltd. Air Craft

Newcas le-on-Tyne.
Telephone ... ... CENTRAL NEWCASTLE 2604.
Telegrams ... "DEPENDABLE, NEWCASTLE."

Southampton House,
High Holborn, W.C. 1.
Telephone ... ... HOLBORN 1876.

Auster LONDON. FOR Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE DOPE
The Original
Non-Poisonous
SEE ADVERT. INSIDE.

WAKEFIELD Castrol MOTOR OIL
"R" (Racing)
THE ONE OIL for ALL AERO ENGINES.
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

TELEPHONE:- OLDBURY 111. ACCLES & POLLOCK, LIMITED. TELEGRAMS:- ACCLES OLDBURY
WELDLESS STEEL TUBES FOR AIRCRAFT CONSTRUCTION.
SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.
TRIPLEX SAFETY GLASS
The TRIPLEX SAFETY GLASS CO., Ltd. 1, Albemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street, BIRMINGHAM.

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK

SAFES.

COOKE'S (FINSBURY) LTD.

FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

Telephones { LONDON WALL { 6179 573

See Telephone Book relating to our Shopfitting, Signs and other Departments

THE "Autoclipse" Dope Can, 7 inches diameter, has been designed to overcome the defect existing in many cans at present being used. It is economical and clean, and easily fitted. The contents are always in view.

The Autoclipse
REGISTERED TRADE MARK

FITTED with Bail Handle and palette grip. Improved inclined mouth to allow material to return to vessel. Hollowed internal bottom to enable all the contents to be used.



Dope Can.

(HILLS PROV. PAT. 3918.)

Prevents Waste.

No. AV 10/1.

Supplied with or less aperture for brush handle.

Price:

Type A (plain flap) ... 6s.
,, B (Aperture flap) 6s.

DELIVERY FROM STOCK.



Brown Brothers Ltd

GREAT EASTERN STREET LONDON, E.C.2.

Telegrams: Imbrowned, Bethroad, London. Telephones 6300 London Wall (14 lines).

BRANCHES AT MANCHESTER, PARIS AND MELBOURNE.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

ADAM, GRIMALDI & Co., LTD.

GOVERNMENT CONTROLLED ESTAB ISHMENT

UNDER THE MUNITIONS OF WAR ACT.

AIRCRAFT MANUFACTURERS

- CONTRACTORS TO H.M. GOVERNMENT -

ALBERT EMBANKMENT, VAUXHALL, S.E

Telegrams: "Autocoach, 'Phone, Londo ."

Telephone: Hop 5552 (3 li

W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
47, VICTORIA ST., S.W.

HIGH ST., MERTON, and HENDON

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.

School Approved by R. Ae. Club.

PUPILS COACHED FOR THE ROYAL AIR FORCE.

Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**



THE firm of Boulton & Paul, Ltd., was established in the Eighteenth Century and has enjoyed for many years a world wide reputation as engineers and craftsmen in metal and woods. In the making of aircraft it brings to bear on the problems of a new industry knowledge and experience possessed by scarcely any other firm. Coupled therewith is a determination to maintain at all costs the fame it has so long enjoyed for the high quality of its products.

BOULTON & PAUL, LTD.

Makers of Aircraft NORWICH

Founded 1797

Wires: Aviation, Norwich. *'Phone:* Norwich 15.



We can deliver
A·G·S·
Shackles
158
Sizes A, B & C
in any
QUANTITIES
AT ONCE

Contractors to the Air Ministry
and their leading Constructors.

The Actual Manufacterers
The British Gold Shell
Ring Co., Ltd.,
Hounslow, Middlesex

Telegraphic Address
"GOLSHEL, HOUNSLOW"

Telephone Address
HOUNSLOW 254.

TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE-ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.


WHITEHEAD
AIRCRAFT
RICHMOND
SURREY

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

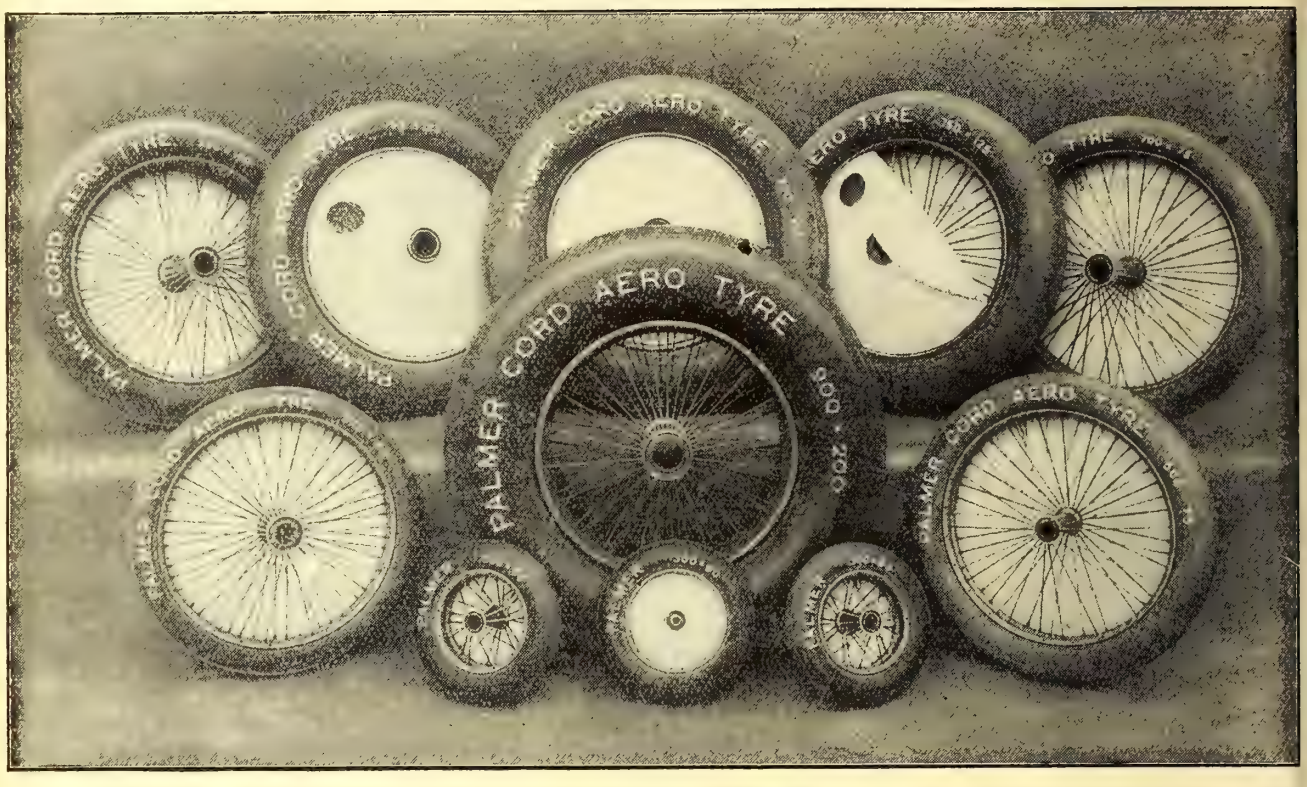
London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m/m	m/m			m/m	m m	m/m			m/m	m/m	m/m
300×60	16	111.12	25.4	Central	700×100	33	150.	38.09	Central	800×150	†41	185.	55.	Central
,,	17	72.39	12.7	Central	,,	77	178.	44.45	132/46	,,	82	185.	55.	135/50
450×60	30	89.	31.75	Central	,,	92	185.	55.	135/50	,,	85	185.	55.	Central
575×60	21	160.	28.	Central	,,	95	185.	55.	Central	,,	106	185.	47.62	135/50
,,	34	150.	31.75	104/46	,,	96	178.	55.	132/46	,,	†205	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	99	178.	38.89	132/46	1000×150	97	250.	65.4	Central
650×65	78	178.	44.45	132/46	,,	112	150.	40.	Central	,,	102	185.	55.	125/60
,,	79	178.	44.45	Central	650×125	119	178.	55.	132/46	,,	201	185.	60.32	125/60
,,	100	178.	38.09	132/46	750×125	33	150.	38.09	Central	900×200	107	185.	55.	Central
,,	101	178.	31.75	132/46	,,	77	178.	44.45	132/46	,,	108	185.	55.	125/60
600×75	21	160.	28.	Central	,,	92	185.	55.	135/50	,,	120	185.	66.67	125/60
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	208	185.	60.32	125/60
700×75	78	178.	44.45	132/46	,,	99	178.	38.89	132/46	1100×200	52	185.	55.	116/69
,,	79	178.	44.45	Central	,,	112	150.	40.	Central	,,	57	185.	55.	Central
,,	100	178.	38.09	132/46	800×150	†36	185.	55.	135/50	,,	203	185.	60.32	116/69
,,	101	178.	31.75	132/46	,,	†40	185.	60.32	135/50	,,	204	185.	60.32	Central

†*Wheels Nos.* 36, 40 41, *and* 205 *are of stronger type than the other wheels for* 800 x 150 *tyres.*

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.

SELSDON

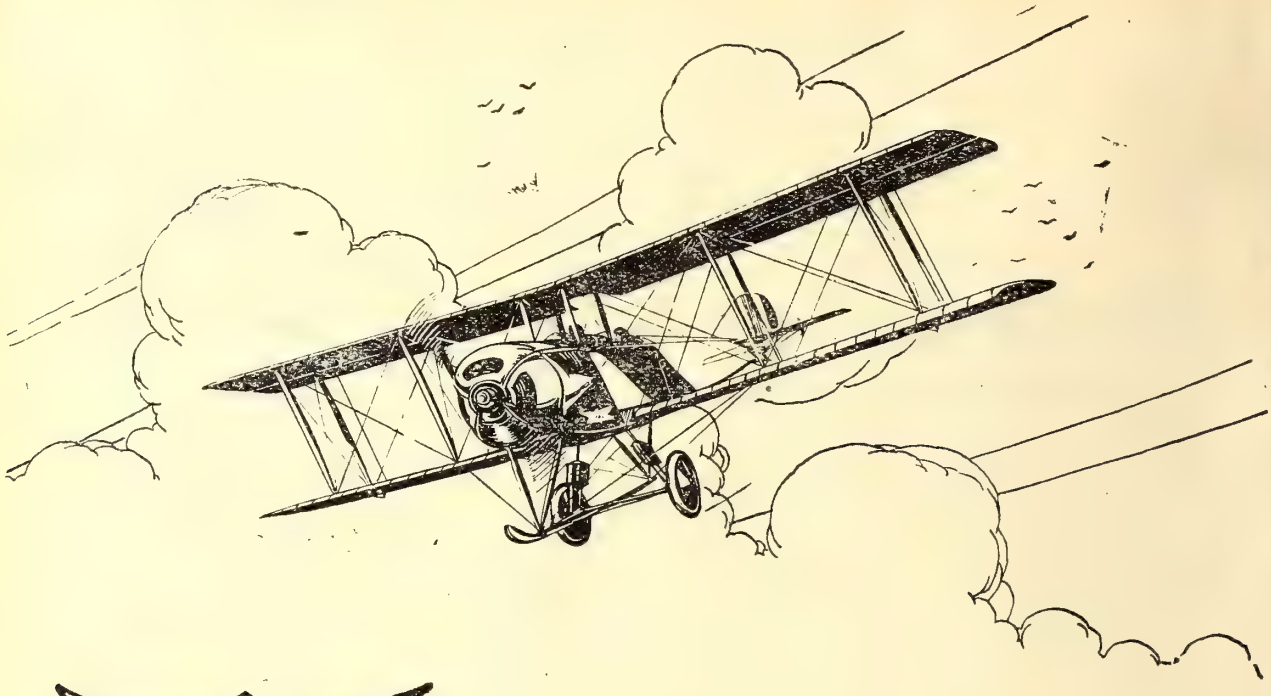
AERO & ENGINEERING CO., LTD.,

1, ALBEMARLE ST., W.1.

Telephones—REGENT 1181. CROYDON 1761.
Telegrams—SELAERO, PHONE, LONDON. SELAERO, CROYDON.

SPECIALISTS
IN
TANKS
AND
TANK FITTINGS
FOR
DeH. MACHINES

MAKERS OF METAL PARTS AND FITTINGS.

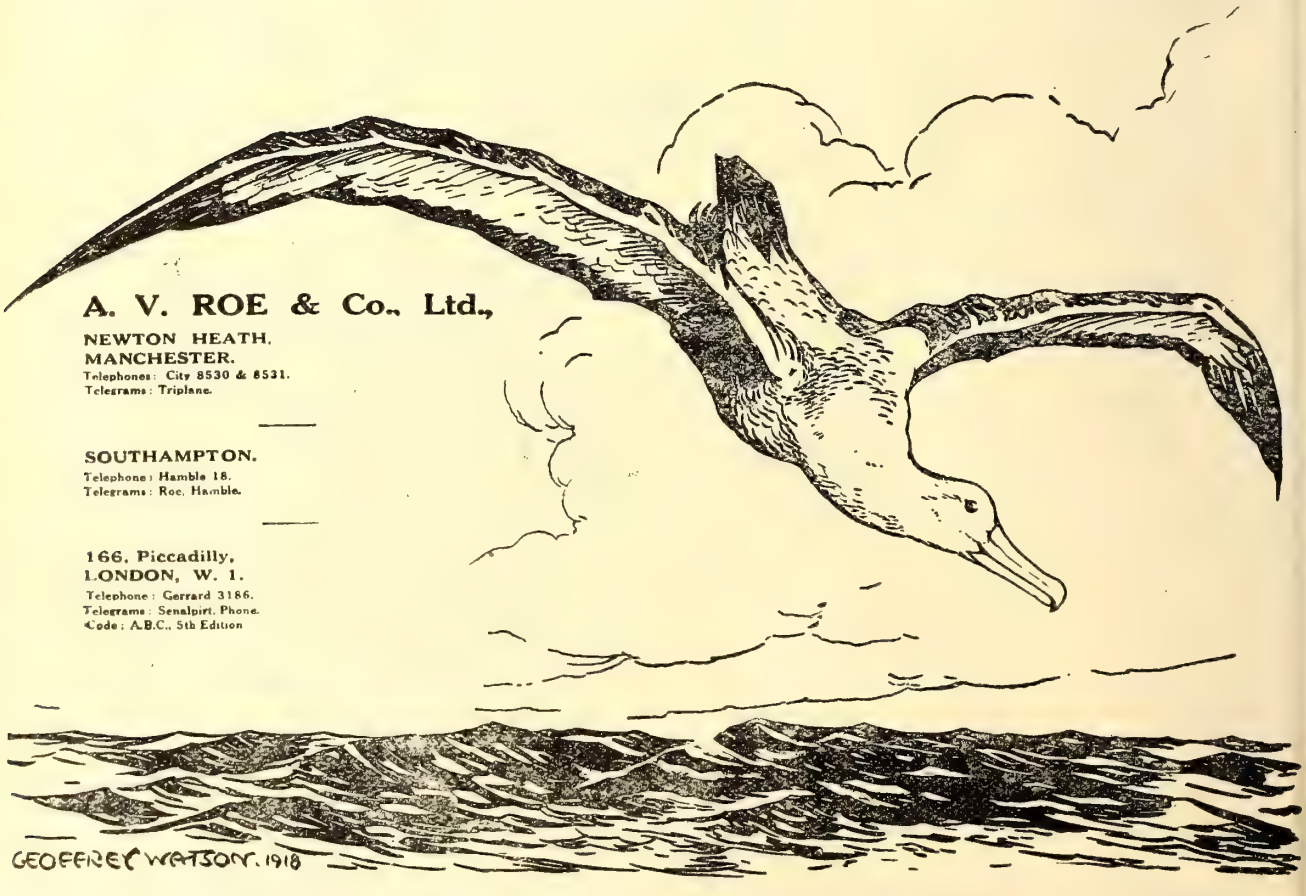


AVRO

AEROPLANES

AND

PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Senalpirt, Phone.
Code: A.B.C., 5th Edition

GEOFFREY WATSON. 1918

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London, W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of:
The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, 1 Year, $8.
U.S.A., 1 Year, $8.50c.

ON ALLOTMENTS ON PARNASSUS.

This is the age of amateurs. The country is run by politicians who are mere amateurs at the game, despite the fact that some of them make a handsome living out of it over and above their statutory £400 per annum or their Government salaries. The War on land is run by amateur strategists, though one hopes the professional soldier will come into his own ere long. The War at sea has, until recently, been conducted in a still more amateurish way, though, in justice be it said, most of the hard and perilous work of strafing submarines has been done by merchant sailors and fishermen, who are professionals of the highest class as seamen, as well as being amateurs of war in the true sense of the word. The War in the air, except as concerns the soldiers at the front, has been hampered from the start and is still hampered by amateurs of the very worst kind, for one of the outstanding facts of the supply of aircraft is that, except for a few, very few, patriotic men who are serving their country in the best possible way, there is hardly an official on the technical side of the Air Ministry who could get a job in civilian life with a business firm if taken on his merits and not on account of his "Service pull."

The Finances of the country are run by amateurs whose efforts to raise money are as funny as the famous 'Pantomime Rehearsal," for any professional money sharp, from a snide company promoter to the ordinary proprietor of a gambling hell who lives by rooking young officers of their pay, would have raised twice the money with half the fuss. And, finally, the country is being fed very largely by amateur gardeners, whose earnest, if frequently misguided, efforts in their funny little allotments are compensating for lack of official foresight and failure to foster agriculture before the War.

The Amateur in Art.

It is not surprising, therefore, to find that this national epidemic of amateurism has spread to the Arts, and that the Heights, or at any rate the foot-hills, of Parnassus are being sedulously cultivated, very much on the allotment principle, by innumerable amateur poets. Naturally the Flying Services and their appurtainers have begged out their claims on the slopes, and, like other products of allotment gardens, the results vary immensely in quality. It is always well to remember that the word amateur has two very distinct meanings, the true original meaning and the commonly accepted meaning which is used as an opprobrious epithet.

Naturally, also, some of the choicest products of these allotments on Parnassus have from time to time found their way to this office, so it seems worth while, just for a change, to pretend that for the time being the War is going well on the Bolo Sector of the Strand Front, and to present to the long-suffering readers of this paper a selection of verses concerned more or less with flying affairs, in the hope that they will provide a little light relief from the more serious affairs of war. Also, they illustrate something of the inner feelings of the writers, which, however shocking their verse may be, could not come out in mere prose.

The Beginners' Feelings.

Let us begin at the beginning and see how the pupil, or cadet as he is officially known, or "Hun" as he is still called by the old R.F.C. crowd, or "Quirk" as the R.N.A.S. people call him, expresses himself. It will be noticed that the Instructor is not, as a rule, a popular person. He is very much the schoolmaster, but is generally so young that he has not had time to acquire the all-comprehending all-forgiving mind of the true instructor of the young. Also, his pupils are pretty well of his own age, and some are older, which makes his task the more difficult. Frequently he is a war-worn pilot, and, anyhow, constant flying as an instructor is very wearing to the nerves, so it generally happens that the instructor is short and blunt in the temper and long and sharp in the tongue. Hence the following effort:—

PER—VERY—HAPS.

The Pilot who's instructing me
Has many a charming quality,
And chief is, undeniably,
His uniform politeness.
His tact and gentleness inspire
The most unprepossessing Flyer,
No Pupil's faults can dim or tire
His amiable brightness.

If, when he deems the time is high
To take me with him in the sky,
He happens to observe that I
Am busy with a letter:
He'll say, "Oh pray continue, do!
You've got no stamps? Well, here's a few,
I'll take it to the post for you,
That you may fly the better."

When he has mollified me thus
And we have clambered in the 'bus
And taken off—he doesn't cuss
At every little blunder;
But delicately intimates
That so-and-so precipitates
A sideslip on the Squire's estates
And breaks the 'bus asunder.

"Now will you kindly take control?
I'd like it best, upon the whole,
If you will fly her to the goal
Of Salisbury Cathedral;
Yet should she happen to prefer
The Isle of Wight or Winchester,
Don't try to interfere with her:—
It may be her Dihedral."

Then, when I've zig-zagged to and fro
'Twixt Porton Rings and Winterslow
And "Gasoline" is running low
He'll say, "That's splendid! You 'ull
Pan out a pukka pilot, lad.
Your exhibition's not half bad
Considering you've only had
Two dozen hours of 'Dual.'"

"Now try a turn to our left flank."
(Then, when I steer her like a tank)—
"May I suggest a little 'bank'?
I won't insist about it:
Pray don't begin imagining
You *must* depress your inner wing—
Still, it is hardly thought 'the thing'
To make a turn without it."

Then if I start to stall the 'bus
And Pitot's' scarcely more than 'Plus'
He'll say, "I hate to make a fuss
Or seem the least bit 'shirty':
But in the circles where they *dress*
It's thought a sign of '*politesse*'
To keep the speed at never less
Than twenty-five or thirty."

When in this mild paternal way
He's pointed out my faults, he'll say—
"You've done so well, I think you may
Proceed on leave to-morrow:
Your home's in Kent?—I'll fly you there,
It won't be half an hour by air:
Or if you want a railway fare,
Just come to me and borrow."

And when he's dropped me at the gate
He says, "Don't worry if you're late,
For if the O.C. starts a 'Hate'
Your rich deserts I'll tell him."
Then I awoke. . . . . If I possessed
Instructor with such virtues blessed,
Not all the wealth of East and West
Would ever make me sell him. H. T. B.

As an example of sarcasm in its gentlest form those verses should be quite useful to many instructors. If they cause a few of these hard-worked and sorely tried gentlemen to abate their acerbity a trifle, they will have served their purpose.

Now we may turn to another aspect of the pupil. One apologises for his language, but in the interests of realism it would be a mistake to edit him. Many a hardened air-fighter, with orders and decorations to his credit, will recall that horrid feeling of going aloft for the first time in the old Maurice Farman "short-horn" biplane, commonly called a "Rumpty," which, though an excellent machine in the air, was alarmingly jellified on the ground. However, let the Hun tell his own tale of woe:—

THE RUMPTY FEAR.

I was a Hun but yesterday, you were a Hun last year
So you'll understand, I know, when I talk of the terrible "Rumpty Fear."
They put me into a sort of cage a maze of sticks and wire
With a petrol engine hung behind, that turned my thoughts to fire.
They sat me down in a little chair in a box of dented tin,
And all there was 'twixt me and space—how thin, ye Gods! How thin.
Another man got up in front, who said he'd fly me round.
Extr'ordinary the faith I had he'd get me back to ground.
They put my hands upon a stick with handles at the side
And into pedals on the floor my feet by straps were tied.
Around my waist a belt was fixed and fastened up with locks,
And there I was trussed like a fowl inside that damned tin box.

The brute in front looks round and grins. "All right," he cries, "Contact."
I try to mutter "Let me out," my voice just will not act.
A bang, a roar, the whole machine starts shaking like a jelly,
The ground recedes and in my mouth I find my wretched belly.
The stick to which my hands are glued starts wobbling about,
The beast who's sitting in the front begins to point and shout.
The earth and sky go whirling by all jumbled in my eyes.
I draw my breath and clench my teeth and think "Oh! fool unwise!
Why eat your stomach in the air before this roaring fan
When you might eat your food on earth like any decent man?"

A pop, a bang and silence! We are diving for the ground,
My inside's in my mouth again, my terror's most profound.
We land upon the aerodrome and taxi in again,
The saviour of my life gets out, *he* doesn't show the strain.
He turns a tired eye on me and says in bored contempt
"To-morrow if the weather's fine we will again attempt,
Your turns and things are pretty dud, your landing's rotten too,
"We'll send you solo all the same after another few."
Ugh! Er! to be alone in that damned awful box of tin.
I hie me off immediately to drown my thoughts in gin.

With ginger-beer one hopes, for neat gin is not good for youngsters, especially in hot weather. The general impression certainly bears out General Brancker's famous dictum that no pupil ever really sees anything during the first hour which he spends in the air. The curious thing is that people who start by being in a blue funk often become, after a little experience, the coolest and most self-possessed of pilots.

Now we can progress a step further to the advanced pupil who is flying across-country and doing fighting practice preparatory to going over-seas. Here is what he thinks about it:—

WERE YOU EVER ALOFT . . . . ?

Were you ever aloft in an aeroplane,
When the clouds were thick and low,
And you couldn't find the aerodrome,
Or a single place you know;
When you didn't know where you were at all,
With earth you'd lost connection,
And it seemed each way you headed the 'bus,
Turned out the wrong direction?

Were you ever aloft with an engine,
When its revs. keep slowing and slowing,
And you hold her nose down to keep up speed,
And into a gully you're going;
When every moment you think she'll konk,
And you swear as a pilot would,
And after a final effort you find
It's only the pressure that's dud?

Were you ever aloft on an altitude test,
Ten thousand feet in the air,
With the old 'bus climbing so awful slow
You thought you'd never get there;
At last you reach the height you want,
And swiftly down you come,
Knowing you've one less test to do,
And your hands and feet are numb?

Were you ever aloft to do some stunts,
A loop is the first you try,
You hang on your belt when at the top
Then "wind-up," and C.I.
When you taxi in on the aerodrome,
To your instructor you explain
And promise you'll roll and spin next day,
But he sends you up again?

Were you ever aloft with a feeling of pride,
In your progress in learning to fly.
Your air-work is good and you stunt a bit,
And your confidence is high;
But how cheap you feel when one fine day
Your hopes receive a check,
You land cross-wind, and, dreadfully peeved,
You clamber out of the wreck?

Were you ever aloft in a practise scrap
With a pilot who is more clever,
He does a half-roll and gets on your tail,
And you cannot shake him,—never:
Your camera gun is useless to you,
For turn or stunt as you will,
He is taking his pictures right along,
You're lucky snaps don't kill?

Somehow these verses give one quite a good notion of the various little annoyances and disappointments of the pilot who is coming on well, and has not yet acquired the gift of flying by instinct, or rather doing his flying sub-consciously. The versifier's rhymes and metre are not above reproach, but he gets his ideas home all the same.

As a transition from the beginners to the active-service people, here is a little thing by a flight-commander who has been in the flying game pretty well from the beginning. Whether his nightmare was caused by too much good living, or by strain of service over-seas, or by the "worrits" of innumerable unsatisfactory Quirks or Huns one would not hazard even a guess. However as the nightmare of a specialist it is quite a good effort:—

THE AIRMAN'S NIGHTMARE.

I can see a white hot engine
Three inches from my nose,
The petrol tank a blazing hell
Just underneath my toes.



SIR WILLIAM WEIR.

Secretary of State for the Royal Air Force.

The wires are snapping round my head.
The rudder-bar has jammed.
Both wings are cracking horribly.
My eyes with oil are crammed.

My poor observer's fainted
And fallen through the plane,
I'm sorry, because I liked him.
Life's full of joy and pain.

Great Scott! one wing has fallen off,
The other's badly gashed.
The earth's ten thousand feet below.
The elevator's smashed.

Revolution indicators
Are tearing out my hair.
My goggles are waltzing round me
Humming the "Druid's Prayer."

The lubrication oil tank
Is forced between my teeth.
O why do the pistons chortle
Like asthmatical breath?

Four propeller blades are fighting
The bent induction pipe.
The inlet valves they swear aloud.
The fabric tastes unripe.

The stays are crooning plaintively
To soothe the petrol tap.
The engine jumps its bearers, bursts,
And settles in my lap.

I'm falling faster and faster,
I do so want to yell,
But when I reach the earth again
Won't I have lots to tell?

A fearful crash! I hit the ground.
. . . I've fallen out of bed!
Think goodness I'm awake once more
Holding my throbbing head.

Again the metre and rhyme are not perfection, but the material is there, and, to use the vulgar but expressive theatrical *cliché*, he "gets it across."

Another cause of nerve trouble at the aerodrome, the non-stop talker, is handled graphically in a few brief but pithy lines. One hopes that they will touch the spot in several instances:—

THE SAD STORY OF JOB McCREE.

("Some" distance after Keats.)

A chap there was, named Job McCree,
Who did adorn the R.F.C.
He talked so much and gave no peace,
His friends said: "Tell that thing to cease!
Stop babbling, pray!" But did he? Nay,
Short of a charge of T.N.T.,
Nothing *could* silence Job McCree.
His comrades, through the day, in tears,
Toiled with his sweet voice in their ears,
At night, with blankets round each head
They camouflaged themselves in bed.
At last: "Haul out the 'bus!" cried one;
"I've had enough of this, my son!
Come forth with me and you shall see
Stars of exceeding brilliancy."

* * * * * *

And from an height they dropped the wight,
Deep down into a marsh he fell.
They searched full diligent and well,
Yet found him not, but in one spot
Ever since that eventful day,
Bubbles rise upwards, so they say,
As though, communing with himself,
He talketh still, unhappy elf!

E. S. F.

ON ACTIVE SERVICE.

Now let us turn to the active-service people. Here one finds, quite naturally, a more joyous spirit than exists amid the wearisome round of aerodrome drudgery. Let the first place be taken by the representative of the Senior Service, now, at any rate for the time being, merged in the R.A.F.:—

R.N.A.S. "TAILS WELL UP."

We're flying by day, and we're flying by night;
We've harried the Hun, and have put him to flight.
Oh, I tell you Life's great to R.N.A.S. fellers,
Who, I hear it is said, are the Air Cinderellas!

In the grey of the dawn, in the black of the night,
'Planes heavy with bombs, till at length they are light;
For the trails left behind us, are always the tellers
When the stunting is done by the Air Cinderellas.

A. M. O.



TEACHING THE YOUNG IDEA: A Lecture to the Observers on aerial fighting.

here one has not only the *joie de vivre* but the more inspiring *joie de tuer*. Brief as are the verses, they breathe the good old English spirit of destruction as exemplified in the classic sentence attributed by a satirical Frenchman to the English sportsman :—"What a lovely day! Let us go out and kill something!"

Another excellent example of the same breed is a set of verses by a young fighting pilot, now permanently disabled, but as full of fight as ever :—

"THE HYMN OF HATE."—OFFENSIVE PATROL.

Onward, Baby Nieuports,
Flying out to war,
Lewis guns all loaded
Engines all a'roar.
See, the Flight Commander
Leads against the foe,
Five machines with engines revving
Cylinders a'glow.
Onward, Baby Nieuports,
Flying out to war,
Lewis guns all loaded
Engines all a'roar.

At the sign of triumph
The wily Hun doth flee.
"Dive then, Baby Nieuports,
Dive to victory."
Albatroses quiver,
Engines glowing red,
Crack! crack! crack! behind them.
Pumping them with lead.

See the Albatros's
Tanks begin to leak,
As the guns of Nieuports
One and all do speak.
Diving ever downwards,
Every wily Hun,
Into flames they're bursting.
"Nieuports—you have won"

Pull your joy-sticks backwards
Zoom towards the skies.
Up to fifteen thousand
Fast the Nieuports rise,
Guns once more are silent,
All their rounds are loosed,
Now they're flying Westwards—
Flying home to roost.

Welcome, Bristol Fighters,
Who towards us soar,
Blend with ours your engines
As we homewards roar
"We have done much battle
With the Albatros,
Never will they fly again
Now they bite the moss."
Onward, Nieuports, Bristols,
Flying out to war,
Lewis guns all loaded
Vickers guns galore.

As the note on bought music remarks, "This song may be sung without licence," and probably without restraint. One fears that the perpetrator is a graceless young scamp, and that the ultra-pious will not approve of his stealing the metre of a popular hymn and fitting his verses to the tune thereof, but the spirit of the verses is so near the spirit of the hymn that logically there seems no ethical difference between the two. It is true that the first line would have to be sung, "Onward, Baby New-hoo-pores," to make it fit the tune, but probably that would only add to the sonority of the chorus.

Anyhow, it is the hymn of a fighting man, and its sentiment is preferable to that of hymns like that containing the lines, "Whatever, Lord, we lend to Thee, repaid a thousandfold shall be." Somehow the desire for 100,000 per cent. interest on gilt-edged security of such a nature has always struck one as conveying a pretty poor idea of the good pious person who wrote it.

(To be continued).

THE DEATH OF BERTRAM COOPER.

All those who have been long concerned with aeronautics will learn with deep regret of the death of Mr. Bertram G. Cooper, formerly secretary of the Aeronautical Society. Mr. Cooper was killed in an aeroplane accident on June 8th, when flying as a passenger on what was his first flight, despite his long connection with aeronautical affairs.

Bertram Cooper was in the Civil Service when he took over the secretaryship of the Aeronautical Society from Mr. T. O'B. Hubbard (now Lieut-Col. R.A.F.) on that gentleman joining the R.F.C. in 1913. He continued to fulfil the arduous duties of his office with tact and ability till some time after the outbreak of war, when his natural leanings towards scientific matters led him to join Mr. Griffith Brewer in the Aeronautical Instrument Co. Thence he transferred after a while to the Air Board, where he held a responsible position in the Technical Department.

Mr. Cooper became a widower two years ago, and leaves a son six years of age.

THE IMPORTANCE OF ARMY RECONNAISSANCE.

Lt.-Col. Repington, writing in the "Morning Post" on June 9th, says :—

It is the veiled approach march, the concealed concentration for the offensive, that German Main Headquarters justly vaunts as its masterpiece, as we previously vaunted ours before Cambrai. This German secret we have to penetrate in future, and the work must be done.

It is a matter of comparative unimportance how many air victories our pilots obtain if they do not pay more attention to reconnaissance than to duelling. If our Air Force, and that of our Allies, does not succeed in future in identifying the German approach march, then we must revise our opinions of the advantage of superiority in the air, for this superiority, if it means anything, means superiority and priority of infomation.

It is the same with Intelligence work, and a Commander in the field is very gravely handicapped if either Service fails him in critical days.

THE MASTERY OF THE AIR.

Reuter's special service sends the following message from the French Army on June 5th in connection with the recent German attack.

During the first 24 hours of the battle the German air service had the mastery of the air between the Aisne and the Marne. Its triumph was short-lived. As soon as the attack opened on Monday orders were sent to a powerful aviation group, comprising both fighting and bombardment squadrons, to move to the new battlefield. The entire group, which includes among its aviators some of the best-known aces of the French Air Service, started at once for the Aisne, flying along the German front on the Oise, and causing as much damage to the enemy in its passage as it conveniently could.

The group took the air on Tuesday morning, both fighting and bombardment squadrons, the fighting planes engaging the Boche aviators and descending to within a few score feet of the ground, in order to attack the German troops and convoys on the roads. By the end of the day the balance in the air had been redressed. In the course of Wednesday our supremacy in the air was definitely re-established, and since then it has hardly been challenged. A remarkable number of German observation balloons have been destroyed during the last few days.

THE WILBUR WRIGHT LECTURE.

Considerable additional interest is given to the sixth "Wilbur Wright" Lecture, to be held by the Aeronautical Society of Great Britain on June 25th at the Central Hall, Westminster, by the fact that the chair will be taken by Sir William Weir, Secretary of State for the Air Ministry.

Dr. W. F. Durand, who is to give the lecture, is one of the principal authorities on aviation in the United States. He is chairman of their National Advisory Committee for Aeronautics, and Scientific Attaché to the American Embassy in Paris. Dr. Durand's subject will be "Some Outstanding Problems in Aeronautics."

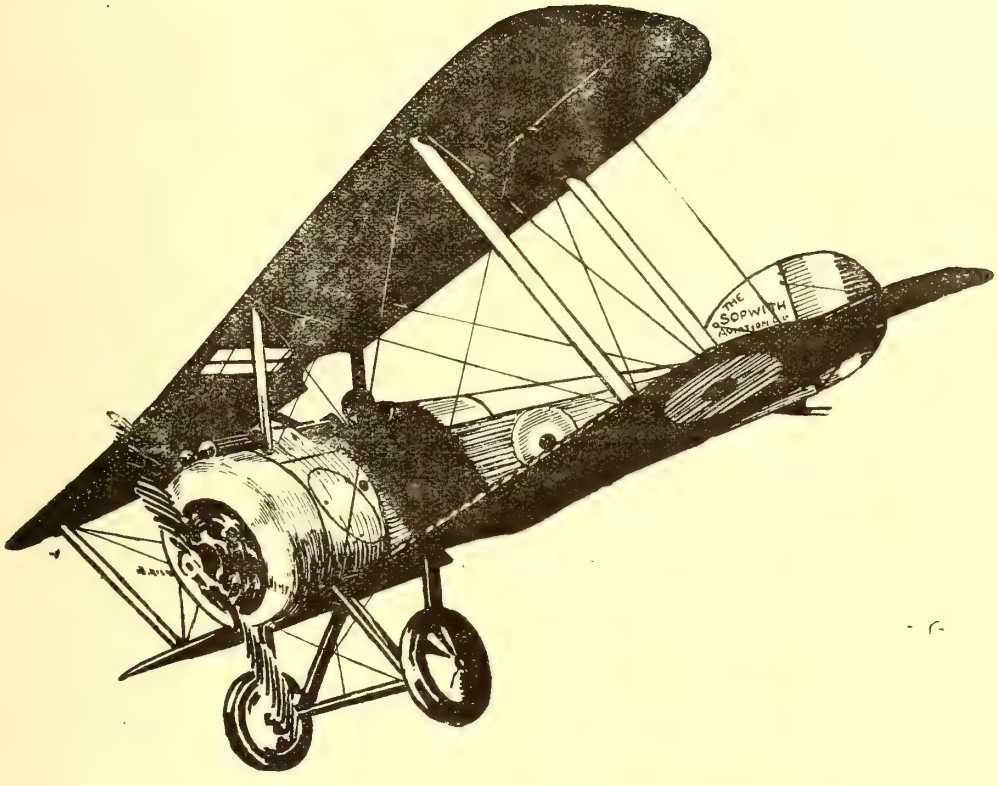
Applications for tickets, which are already in great demand, should be made to Mr. W. Barnard Faraday, the Secretary of the Society, 7, Albemarle Street, W.1.

AIRSHIP AND K.B. PATROLS.

The following presumably official account appeared in the "Times" of June 8th :—

The longer hours of daylight have enabled our seaplanes, airships, and kite balloons materially to assist our surface craft in

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

S.B.A.C. — THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Paris Office:
21, RUE DU MONT THABOR.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

defending merchant vessels and in hunting out the U-boat. The summer conditions favour the submarine hunters, whose incessant searching of the seas forces the German craft to seek deeper waters in the hope of escaping their vigilance.

Particularly good work was performed recently by an observation balloon which was being towed by one of his Majesty's ships through a sector of home waters. The patrol was started at daybreak, and the balloon had not gone far before the observer sighted something which indicated the presence of a submarine. Depth charges were dropped, which caused the submarine to change its position. An hour later a submarine was seen by the balloon to break surface a considerable distance away and to begin shelling a small sailing vessel. The balloon was towed rapidly to the spot. In the meantime the submarine was forced by the towing vessel to cease firing and to submerge. Aided by the balloon the towing ship was able to get over the track of the U-boat, and to drop nine depth charges, as the result of which large quantities of oil rose to the surface and gradually spread to an area of roughly a mile.

One of our airships, also on an early morning reconnaissance, sighted a U-boat engaged in attacking a merchantman. Putting on full speed the airship arrived on the spot just after the submarine had submerged, but the German had not got deep enough to be out of the vision of the airship's crew. A bomb dropped about three feet astern of the U-boat's port evidently gave her a bad shaking, for streaks of oil rose to the surface and the submarine was seen to alter her course to starboard. The airship manœuvred for position and with a second bomb scored a direct hit on the stern of the submarine, causing it to lift towards the surface and roll as though about to turn turtle. More oil rose and the submarine disappeared from the airship's view.

THE FIRST RIESENFLUGZEUG.

The following particulars of a "giant" German aeroplane brought down in France recently were issued by the Press Bureau on June 7th:—

Four engines; span, 136 ft.; length over all, 66 ft. 6 in.; crew, number not definitely known.

The correspondent of the Havas Agency on the French front telegraphed on June 6th that the giant German aeroplane which was brought down on June 1st in the neighbourhood of Retz (south-west of Soissons) carried nine passengers, including the pilot officer commanding, two observer officers and machine-gunners, two specialist engineers, a second pilot in charge of the engines, and two other specialist engineers.

The machine is of the most recent type of giant aeroplanes. Its principal characteristics are as follows:—Four engines, each of 300-horse-power; spread of wings, 43 metres (about 141 feet); total length, 28 metres (about 92 feet); crew, nine men; weight, when empty, 9,200 kilogrammes (over nine tons); weight in flight, when fully loaded, 14,600 kilogrammes (14½ tons); weight of bombs that can be carried, about 2,000 kilogrammes (about two tons); maximum speed, 120 to 130 kilometres (75 to 80 miles) per hour; armament, four machine-guns.

SOUVENIR COLLECTING.

At the Clerkenwell Police Court, Albert Chapman, 36, of Rendlesham Road, Upper Clapton, and Albert Tutt, 41, of Holland Park Avenue, Kensington, aeroplane examiners, were charged, on remand, with being concerned together in stealing an aeroplane float chamber cover and needle valve, value £2, the property of H.M. Secretary of State for War.

Detective Bowton, N division, went to an Enemy Aircraft Viewroom, where he saw the prisoners, and told them he would arrest them for being concerned in stealing a float and a chamber cover and needle from a German aeroplane. The prisoners said they had not got them. On the way to the station Tutt said, "I unscrewed the valve from the machine, but did not intend to take it away."

Mr. Lewis prosecuted for the Treasury, and said the place of the alleged theft would not be mentioned—for obvious reasons. The men were watched and were seen, it was alleged, to be working together, the one covering the other. The matter had been referred to the Public Prosecutor by the Air Ministry, and a serious view was taken in that things might be taken which would be irreplacable. The prisoners were on the premises legitimately, in connection with their occupation

The prisoners pleaded guilty.

Mr. Lewis said there was no unpatriotic purpose suggested but prisoners had given no explanation of their conduct.

Chapman, it was said, came from Australia to work for the Government. He was a skilled man Tutt had been discharged from the Army with wounds, and was employed as a skilled man. Chapman said it was done on the impulse of the moment without any felonious intent beyond securing a souvenir. It had been a lesson to him. Tutt said he took the thing out of the machine out of interest, and as a souvenir.

Mr. Symmons said he believed the defence, but it was a serious matter. Having regard to their good character, and this being the first case o fthe kind he had had, he woud not send them to prison. They would not send them to prison. They them to prison. They would have to pay a fine of £15 each. Any other case of the sort would be dealt with by imprisonment.

POETRY.

In these days of modern sides to ancient schools literature of any kind is hard enough to come by, and poetry, except of the kind so-called which is usually worthily set to tunes for the delectation of suburban drawing rooms, is rarer still. Therefore one owes a debt of gratitude to Maj. the Hon. Maurice Baring for a very small, and therefore precious, book of poems published by Martin Secker, of 5, John Street, Adelphi, W.C.

There are many of the Royal Air Force who from time to time have made efforts to produce poetry. Some few have succeeded, others have produced praiseworthy failures, many have produced excellent humorous verse which is not poetry, but has been highly entertaining. Therefore one recommends to all who appreciate poetry at its best, or who hope some day themselves to be among the poets, that they should acquire Major Baring's book, both for their edification and their education.

Very fittingly the first poem in the book, which is also the longest, is one in memory of Captain Lord Lucas, than whom no man has ever been more fitted to inspire poetry. One can recollect nothing finer of its kind in the English language than this piece of work. Shorter but equally perfect in their workmanship are two other poems, one in memory of Julian Grenfell and the other of one Pierre.

By way of an antidote to the serious poetry, which is all the more serious because of its delicate hints of humour here and there, there is at the end of the book an "Elegy on the Death of Juliet's Owl," a perfectly priceless thing which deserves to go down in the history of literature alongside the "Ode to Corinna's Parrot" by a certain Publius Ovidius Naso—a friend of one's youth.

For all that he has to handle the coarse Anglo-Saxon tongue Major Baring belongs in spirit to the great days of Rome, and though his writings of pre-war days show it more plainly than does this little book, the perfect finish of his work and the perfect use of every word recall the Latin poets alone. One's only regret is that his military duties have prevented Major Baring from producing between 1914-1917 a greater amount of such work.—C.G.G.

THE W.R.A.Fs. AND FLYING.

Apropos the statement made by the Minister of Labour at Sheffield on June 3rd, in regard to a Woman's Air Force, Maj. Baird, Parliamentary Secretary to the Air Ministry, stated in the lobby on June 4th that such a force was really in existence already, holding a position corresponding with that of the W.A.A.C.s. in relation to the Army. There was no reason whatever, he added, why women should not fly quite as well as men. Indeed, they performed the work assigned to them admirably, but there was, of course, no idea of sending them to fight at the front The intention rather was to release men for duties of a more arduous nature. The thing was not being done under any definite scheme, for which at present there was no necessity.

[There is perhaps no reason why any W.R.A.F. should not do anything as well as Maj. Baird does it, but that is no reason for risking valuable aeroplanes in the care of women pilots when there are plenty of men to fly them.—Ed.]

THE BILLETING OF W.R.A.Fs.

An Order in Council has been made to amend the Air Force Act so that the provisions of the Army Act as to billeting shall apply to women who are enrolled for employment by the Air Council as they apply to aviators. Officers of any body of the Air Force with whom the women to be billeted are employed, and the officer commanding that body, are to "be deemed in relation to such women to be their officers and commanding officer; and if any such woman is guilty of an offence in relation to billeting" mentioned in Sect. 30 of the Army Act, she shall be punishable on summary conviction. [Sect. 30 of the Army Act makes it an offence for any person subject to military law to be guilty of any ill-treatment, by violence, extortion, or making disturbances in billets, of the occupier of a house in which any person or horse is billeted.]

THE O.B.E. AN "INSULT."

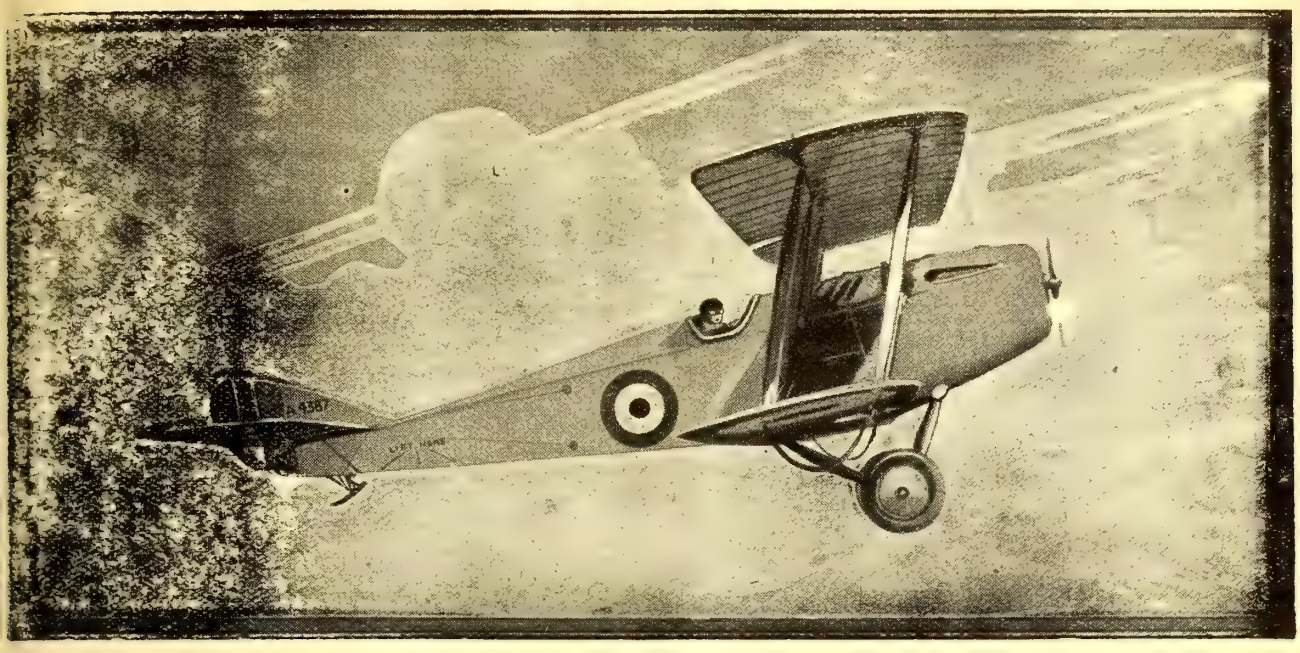
The bestowal of the O.B.E. for war services is regarded more as an insult than a reward by at least one member of the Worcestershire County Council, so says the "Star."

At a meeting of that body on June 10th, the Chairman, Mr. W. Bund, congratulated the Vice-Chairman, Colonel Vincent Wheeler, on being made an officer of the Order of the British Empire, but expressed the opinion that it was a poor reward after the colonel's work in the Army and as Chairman of the War Agricultural Executive. (Cries of "Hear, hear.")

Mr. J. Leadbetter said the honours bestowed on the Chairman and Vice-Chairman were an insult to the county. The list of honours contained names of men who had done nothing but make money, and some of them were of military age.

The Chairman expressed disapproval of the remarks, and added, "We are all grateful, but the measure of our gratitude is another matter."

["And so say all of us." One of the few honest members of Parliament remarked at a lunch the other day that every one of the last four "Honours" lists contained the names of men who were known to be "wrong 'uns."—Ed.]



The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds the World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE

Head Office

WOKING, Surrey.

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."

Telephones:
3906 BRISTOL
(Private Branch Exchange)



NAVAL & MILITARY · AERONAUTICS ·



GEOFFREY WATSON

FROM THE "LONDON GAZETTE."

WAR OFFICE, June 3rd.

The King has been pleased, on the occasion of His Majesty's Birthday, to give orders for the following appointment to the Most Honourable Order of the Bath for services in connection with the war. Dated June 3rd, 1918 :—

C.B. (MILITARY DIVISION).

Lt.-Col. and Bt. Col. (Temp. Maj.-Gen.) Edward Bailey Ashmore, C.M.G., M.V.O., R.A

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to approve of the following reward for distinguished service in connection with military operations in Egypt. Dated June 3rd :—

TO BE BREVET LIEUTENANT-COLONEL ON PROMOTION TO MAJOR.

Capt. (temp. Col.) A. E. Borton, D.S.O., R. Highrs. and R.F.C

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to approve of the following reward for distinguished service in connection with Military Operations in Salonika, dated June 3rd, 1918 :—

TO BE BREVET MAJOR.—Capt. (temp. Maj.) A. Cleghorn, R.E. and R.A.F.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to approve of the following rewards for distinguished service in connection with Military Operations in Italy, dated June 3rd, 1918 :—

TO BE BREVET COLONEL.

Maj. and Bt. Lt.-Col. (temp. Brig.-Gen.) T. I. Webb-Bowen, Bedf. R. and R.A.F.

TO BE BREVET LIEUTENANT-COLONEL.

Maj. (temp. Col.) P. B. Joubert de la Ferté, D.S.O., R.A. and R.A.F.

* * *

The King has been pleased, on the occasion of His Majesty's Birthday, to approve of the following rewards for valuable services rendered in connection with the war. Dated June 3rd :—

TO BE BREVET COLONEL.

Capt. and Bt. Lt.-Col. (Temp. Brig.-Gen.) F. H. Sykes, C.M.G., Hrs., and R.A.F.

TO BE BREVET LIEUTENANT-COLONEL ON PROMOTION TO MAJOR.

Capt. (Temp. Lt.-Col.) L. W. B. Rees, V.C., M.C., R.A. and R.A.F.

* * *

The King has awarded the Albert Medal to Serjt. (Flt. Serjt.) Thomas Nicholl, R.F.C., in recognition of an act of gallantry which he performed in France on February 26th, 1918.

Two bombs exploded under an aeroplane, burning the machine entirely and causing considerable loss of life. Owing to the explosion a phosphorus bomb attached to another machine standing near to it was ignited. Flt. Serjt. Nicholl, with great presence of mind, and regardless of the danger to himself, unhooked the burning bomb and carried it to a place of safety. By his prompt action Flt. Serjt. Nicholl, whose hands were badly burned, saved the second machine and prevented further serious damage and loss of life which would probably have been caused.

* * *

The King has been pleased, on the occasion of his Majesty's Birthday, to give orders for the following appointments to the Most Excellent Order of the British Empire, dated June 3rd, for services in connection with the war.

COMMANDERS (C.B.E.).

Brig.-Gen. Albert Fletcher, M.C., Director of Air Quartermaster Services, Air Ministry.

Brig.-Gen. Francis Conway Jenkins, Director of Parks and Depots, Air Ministry.

Actg. Paymaster-in-Chief Frank Lenn, R.N., in charge of Central Pay Office, R.N.A.S.

Col. John Dolben Mackworth, Deputy Director of Balloons, Air Ministry.

Frederick Handley Page, Esq., managing director, Handley Page, Ltd.

OFFICERS (O.B.E).

Capt. Frank Sowter Barnwell, aeroplane designer, British and Colonial Aeroplane Co., Ltd.

Lt.-Col. Bernard John Wolfe Barry, Staff Officer, 1st Cl., R.A.F.

Maj. Basil Binyon, R.A.F.

Maj. James Bird, R.A.F.

Lt.-Col. Robert Harvey Brand, Asst. Controller of Supplies in Directorate of Aircraft Equipment, R.A.F.

Reginald Ormsby Cary, Esq., director and general manager, Sopwith Aviation Co., Ltd.

Lt.-Col. John Adrian Chamier, D.S.O., Officer Commanding School of Instruction, R.A.F.

William John Cruddas, Esq., Section Director, Aircraft Production Dept., Min. of Munitions.

Lt.-Col. James William Ogilvy-Dalgleish, Asst in the Directorate of Air Personal Services, Air Ministry.

Col. Thomas Edward St. Clare Daniell, M.C., Deputy Director of Aircraft Equipment, R.A.F.

Col. Edward Humphrey Davidson, M.C., Deputy Director of Air Intelligence, R.A.F.

William Henry ffiske, Esq., Managing Director, Messrs. Boulton and Paul, Ltd.

Allen Edward Ford, Esq., Section Director, Aircraft Finance Dept., Min. of Munitions.

Lt.-Col. Harcourt Gilbey Gold, Staff Officer, 1st Cl., R.A.F.

Capt. Geoffrey de Havilland, aeroplane designer, Aeroplane Manufacturing Co.

Lt.-Col. Francis Esme Theodore Hewlett, R.A.F. and Directorate of Aircraft Production.

Miss Hilda Phœbe Hudson, D.Sc., Aero-Dynamics Technical Research, Aircraft Production Dept., Min. of Munitions.

Lt.-Col. John Charters Kirk, Anti-Aircraft Defences, Home Forces.

Maj. Solomon James Lacey, R.A.F., Barrack-master, Seaplane Station.

Frederic Osborne Simeon Leake, Esq., chairman, Messrs. A. V Roe and Co., Ltd.

Lt.-Col. Henry Edith Arthur Lindsay, Staff Officer, 1st Cl., R.A.F.

Lt.-Col. Charles Lloyd, T.D., Anti-Aircraft Defences, Home Forces.

Maj. Michael John Long, Anti-Aircraft Defences, Home Forces.

James Macartney, Esq., chairman, Aircraft Fabric Committee; Member, Irish Sub-Committee, Flax Control Board.

Arthur John McCormack, Esq., managing director, Messrs. Wolseley Motors, Ltd.

Lt.-Col. Tom Darke Mackie, R.A.F., Air Service Constructional Corps.

Lt.-Col. Thomas Anthony Monckton, Technical Officer, R.A.F.

Lt.-Col. Alfred Drummond Warrington-Morris, Staff Officer, 1st Cl., R.A.F.

Thomas Keppel North, Esq., supt. at one of the establishments of Messrs. Vickers, Ltd.

Lt.-Col. Edward Raymond Peal, D.S.C., Directorate of Aircraft Production, R.A.F.

Robert John Addison Pearson, Esq., local director, Messrs. Vickers, Ltd.

Thomas Charles Pullinger, Esq., managing director, Messrs. Arrol, Johnston, Ltd.

Lt.-Col. Alexander Emil Jacques Reiss, R.A.F.; Asst. Controller, Materials Branch, Aircraft Production Directorate.

Lt.-Col. Francis Maude Roxby, R.A.F.

Lt.-Col. Cyril Ambrose Shove, Staff Officer, 1st Cl., R.A.F.

James Moloney Spaight, Esq., LL.D., Acting Principal Clerk, Air Ministry.

Lt.-Col. Ralph Harold Austin-Sparks, Staff Officer, 1st Cl., R.A.F.

Charles Robert John Atkin Swan, Esq , M.B., B.Ch., Admin. Med. Officer, R.A.F. Hosps.

MEMBERS (M.B.E.).

Abbott, Maj. Charles Reginald, Staff Officer, 2nd Cl., R.A.F.

Ainslie, Maj. Eustace Montagu Lafone, Controller of a Reception Park, Aeroplane Supply Depot, R.A.F.

Allen, Maj. Michael Henry Percival, Staff Officer, 2nd Cl., R.A.F.
Andrews, Maj. Cyril Rogers, Staff Officer, 2nd Cl., R.A.F.
Atherton, Sec. Lt. William Thomas Finley, Anti-Aircraft Defences, Home Forces.
Ball, Lt. Frank Clement, Anti-Aircraft Defences, Home Forces.
Birch, Capt. Wyndham Lindsay, W. Yorks. R., attd. R.A.F.
Brown, Lt. Cecil Norman, Anti-Aircraft Defences, Home Forces.
Clutterbuck, Miss Millie Gertrude, Registry, Air Ministry.
Coe, Capt. Charles George, Equipment Officer, R.A.F.
Coleridge, Sec. Lt. Colin Goss, R.A F.
Dashwood, Capt. Sidney Lewes, Brigade Wireless Organisation Officer, R.A.F.
Edge, Maj. Percy Granville, Staff Officer, 2nd Cl., R.A.F.
Fooks, Capt. Philip Edward Broadley, Anti-Aircraft Defences, Home Forces.
Gamble, Maj. Charles William, Staff Officer, 2nd Cl., R.A.F.
Gibson, Capt. William Walker, special employment at a Port Depot, R.A.F.
Hall, Maj. Robert, Aircraft Park Commander, R.A.F.

War Office, June 4th.

REGULAR FORCES.—Memorandum.—Lt.-Col. (Hon. Col.) J. W. E., Lord Montagu, C.S.I., T.F. Res., to be temp. Brig.-Gen. whilst empld. as Adviser for Mech. Trans. Servs., Army Hdqrs., India, April 30th.

Air Ministry, June 4th.

R.A.F.—The following temp. appts. are made at the Air Ministry :—

Staff Officers, 2nd Cl.—C. M. Carington, M.C. (Capt., Spec. List), and is granted a temp. commn. as Capt. and to be temp. Maj., whilst so empld., April 1st; Maj. H. Elwell, May 17th.

The following temp. appts. are made :—Brig.-Gen. Admin.—And to be temp. Brig.-Gen. whilst so empld. :—Maj. (temp. Col.) B. C. Fellows, from Col. I/C. Admin. ; Maj. (temp. Col.) A. L. Godman, D.S.O., from Col. I./C. Admin., June 5th.

Staff Officers, 2nd Cl.—And to be temp. Majs. whilst so empld., if not already holding that rank :—Maj. A. R. Martin, Capt. J. T. North, April 24th; Lt. (temp. Capt.) J. S. Barnes, Capt. C. E. Foggin, Capt. J. H. C. Minchin, Capt. E. J. D. Routh, Capt. W. S. Scott, M.C., Lt. (temp. Capt.) H. St. G. Smallwood, May 21st.

Staff Officers, 3rd Cl.—And to be temp. Capts. whilst so empld., if not already holding that rank :—Lt. (temp. Capt.) F. Egerton, vice Capt. J. T. North, April 24th; Lt. (Hon. Capt.) H. M. Goode, Capt. F. E. Hellyer, Lt. (temp. Capt.) H. D. Williams, M.C., May 21st.

Flying Branch.—To be temp. Lt.-Cols. whilst empld. as Lt.-Cols. (A. and S.) :—Capt. (temp. Maj.) V. Nicholl, D.S.C., April 1st; Maj. C. E. Maude, May 22nd; Maj. H. Stanley-Adams, D.S.C., May 28th, seny. April 17th.

Lt. (temp. Capt.) B. C. Windeler to be temp. Maj. whilst empld. as Maj. (K.B.), May 27th.

Lts. to be temp. Capts. whilst empld. as Capts. (A. and S.) :—J. H. Simpson from S.O., April 1st; H. F. Lindo, April 15th; G. Andrews, April 29th; W. O. Boger, H. B. Maund, May 10th; R. M. Foster, May 15th; R. T. Barlow, May 17th; W. A. Tyrrell, May 18th; L. S. Kiggell, May 19th; O. C. Rusden, May 21st; G. Irving, May 22nd; E. F. Peacock, May 23rd; F. W. Deane, May 25th; F. A. Laughlin, May 26th; H. le R. Wallace, May 27th.

Lt. D. C. Bauer to be temp. Capt. whilst empld. as Capt. (K.B.), May 17th.

Lt. (Hon. Capt.) H. S. Scroggs to be temp. Capt. whilst empld. as Capt. (Dir.), May 20th.

Sec. Lts. to be temp. Capts. whilst empld. as Capts. (A. and S.) :—A. A. Leitch, May 20th; G. D. Horton, May 26th.

P. B. Williams, M.C. (Hants Yeo., T.F.), is granted a temp. commn. as Lt. whilst empld. as Lt. (K.B.), May 17th.

C. G. F. Carver to be Sec. Lt. (K.B.), from Sec. Lt. Admin., April 29th.

Temp. Lt. (Hon. Capt.) P. W. Brodie (Obsr. Officer) to be temp. Lt. (Hon. Capt.), A. and S., April 2nd.

Temp. Lts. Obsr. Officers, to be temp. Lts. (A. and S.) :—A. E. Woodbridge, April 3rd; H. W. Rick, April 5th; F. C. B. Greene, April 8th; D. H. King, April 12th; S. L. Shannon, April 20th; R. I. Dines, F. Yorke, April 21st; A. S. Rayner, G. Bliss, H. Rowbotham, J. McDonald, G. S. Morgan, B. H. Street, L. S. Brooke, April 22nd; G. S. Day, M. W. Richardson, J. F. Stallard, D. C. W. Sanders, April 25th; R. S. Rudd, April 30th.

Temp. Sec. Lts., on prob., late Gen. List, R.F.C., to be temp. Sec. Lts. (A. and S.) :—A. Nugent, April 2nd; M. H. McErlean, April 5th; C. W. Jones, April 7th; G. G. Midgley, April 12th; H. H. Whitlock, April 17th; F. L. Le Lievre, April 18th; W. F. Washington, April 19th; J. C. H. Holmes, L. H. Weedon, April 20th; T. E. Simpson, April 22nd; J. L. Hill, J. T. Brown, April 23rd; K. S. Laurie, E. S. Housley, April 24th; D. Mallett, A. T. Williams, G. R. Iles, O. D. E. Hillsdon, R. Ridyard, E. R. A. Biggs, R. H. Dunn, D. Lewis, April 25th; G. C. Hope, J. W. Gray, G. W. Baguley, J. B. Holbrook, C. H. Bridge, April 26th.

The follg. are granted temp. commns. as Sec. Lts. (A. and S.) :—W. V. Trubshawe (temp. Lt., L'pool R.), and to be Hon. Lt., April 19th; W. H. A., Viscount Ipswich (Lt., C. Gds.), and to be Hon. Lt., April 20th; T. J. Meredith (Lt., Brit. Columbia R., C.E.F.), and to be Hon. Lt., April 23rd; C. F. Laxton (temp. Lt., attd. W. Yorks R.), and to be Hon. Lt., April 24th; T. Brandon, M.C. (temp. Sec. Lt., attd. Durh. L.I.), April 25th; F. F. McCulloch, M.C. (temp. Lt., Saskatchewan R.), and to be Hon. Lt., April 26th.

The follg. are granted temp. commns. as Sec. Lts. (K.B.) :—E. K. W. Denton (temp. Lt., R.F.A.), and to be Hon. Lt., April 1st; C. G. F. Carver (from Admin. Branch), April 29th; H. R. Watterson (Sec. Lt., R.G.A., Spec. Res.), B. Miller, M.C. (Sec. Lt., R.G.A., Spec. Res.), April 30th; E. E. Morgan, M.C. (Sec. Lt., R.G.A., Spec. Res.), May 3rd; F. G. Taylor (Sec. Lt., R.G.A., Spec. Res.), May 4th; J. O. Robson (temp. Lt., Lab. Corps), and to be Hon. Lt., H. F. Birchal (temp. Sec. Lt., R.E.), May 5th.

The follg. are granted temp. commns. as Sec. Lts. (K.B.) :—F. W. Smith (Lt., S. Notts and Derby. R.,T.F.) and to be Hon. Lt., May 19th; R. H. Hampton (temp. Lt., R.E.), and to be Hon. Lt., May 20th.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) to be temp. Sec. Lts. Obsr. Officers) :—J. B. Norton, A. J. H. Thornton, April 14th; E. N. Lohmeyer, D. G. Fraser, April 16th; J. A. Weatherley, H. Tannenbaum, April 17th; G. R. La Cecilia, April 18th; D. V. Crawley, H. Atkinson, April 20th; L. M. Thompson, E. R. Stewart, April 21st; E. B. Hyde, J. Harrison, F. G. Brown, B. Hall, J. A. Wilson, W. I. E. Lane, April 22nd; G. A. Cameron, April 25th.

The follg. are granted temp. commns. as Sec. Lts. Obsr. Officers :—W. B. Ives (temp. Lt., A.S.C.), and to be Hon. Lt., April 14th; H. Stanners (temp. Sec. Lt., R. Muns. Fus.), April 15th; F. F. Hutchinson (Lt., Lord Strathcona's Horse, C.E F.), and to be Hon. Lt., G. H. Hobson (temp. Sec. Lt., Northd. Fus.), E. V. Preston (Sec. Lt., W. Yorks. R., T.F.), April 16th; H. B. Wilson (temp. Capt., A.S.C.), and to be Hon. Capt., R. K. Inches (Lt., R.E.), and to be Hon. Lt., A. E. Cripps (temp. Sec. Lt., K.R.R.C.), F. C. Sawyer (Sec. Lt., E. Yorks. R., T.F.), April 17th; D. Gardner, M.C. (Lt., Dragoon Gds.), and to be Hon. Lt., G. N. Thomson (temp. Lt., High. L.I.), and to be Hon. Lt., April 18th; C. E. E. Boult (temp. Sec. Lt., attd. Yorks. L.I.), April 19th; E. L. O'Leary (Lt., C.F.A., C.E.F.), and to be Hon. Lt., T. J. Molony (Lt., R.W. Kent R., Spec. Res.), and to be Hon. Lt., T. B. M. Brown (Lt., R.F.A., Spec. Res.), and to be Hon. Lt., A. Lomax (temp. Lt., R.F.A.), and to be Hon. Lt., A. R. A. Miller (temp. Sec. Lt., attd. S. Lancs. R.), B. Donald (Sec. Lt., Lond. R., T.F.), W. A. B. Buscarlet (Sec. Lt., R.G.A.), April 20th; C. W. Gladman (temp. Sec. Lt., R.W. Surr. R.), P. V. De la Cour (temp. Sec. Lt., S.A. Inf.), C. W. Davies (temp. Sec. Lt., R. Scots), W. I. Crawford (temp. Sec. Lt., attd. K.R.R.C.), W. G. Robins (Sec. Lt., Lond. R., T.F.), April 21st.

The follg. are granted temp. commns. as Sec. Lts. (Obsr. Officers) :—L. W. Edmonds, A. R. Levey, C. C. G. Ravine, W. Davies, C. A. Firmin, E. J. Richardson, J. Blair, F. C. Edney-Hayter, G. E. Izzard, J. E. Pritchard, A. N. Thomson, May 4th; G. Storey, J. F. Vickerton, T. Bailey, E. R. Beesley, C. G. Boothroyd, N. G. Breeze, H. O. Bryant, A. S. Draisey, C. F. R. Goodyear, J. Hills, J. C. Holmes, J. B. Leach, A. McKenzie, W. L. Woodhouse, J. A. Ottaway, S. J. Parkes, W. W. Pollard, G. E. Rochester, J. Y. Round, C. A. Sander, T. H. Souter, F. T. West, W. N. Hartley, L. J. Skinner, H. D. Travers, H. W. Batty, T. J. Bond, E. J. Bowen, T. E. Brewer, P. Davey, E. C. Fletcher, T. Hawkins, A. Hinder, R. S. Lipsett, G. E. D. Low, G. E. Little, J. Munro, J. F. J. Peters, B. Rider, W. C. J. Rogers, E. Roberts, E. S. Sage, C. J. Tolman, W. R. Wright, May 18th.

Lt. (Hon. Capt.) A. H. V. Fletcher resigns his commn. on account of ill-health caused by wounds, and is granted the hon. rank of Capt., June 5th.

Lt. H. H. Tonks resigns his commn., June 5th.

Sec. Lt. A. R. Fairey resigns his commn., and is granted the hon. rank of Sec. Lt., June 5th.

The notification in the " Gazette " of May 21st regarding Lt. (temp. Capt.) A. R. Cox is cancelled.

The surnames of Sec. Lts. J. Aitken and G. F. Petch are as now described, and not as stated in the " Gazette " of May 21st.

Administrative Branch.—R. M. Daniel (temp. Maj., R.G.A.) is granted a temp. commn. as Maj. and to be temp. Lt.-Col. whilst empld. as Admin. Lt.-Col., May 22nd.

Lt. (Hon. Capt.) E. F. Monk to be temp. Maj. whilst empld. as Admin. Maj., April 1st.

H. E. Talbot (Capt., 11th Hrs.) is granted a temp. commn. as Capt., May 9th.

A. Webb (Lt., D. Gds.) is granted a temp. commn. as Lt., and to be temp. Capt. whilst empld. as Admin. Capt., April 17th.

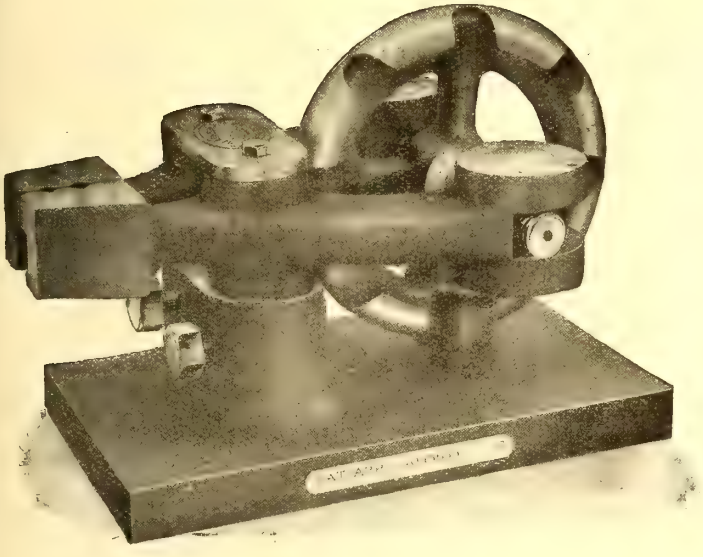
J. R. Croxford, and is granted a temp. commn. as Lt., April 12th.

To be temp. Lts. whilst empld. as Admin. Lts. :—F. T. Court (Qrmr. and Hon. Lt., Gen. List), and is granted a temp. commn. as Lt., May 20th; Sec. Lt. A. W. B. Medhurst, May 21st; R. S. McGregor-Shepherd (temp. Capt., Spec. List), and is granted a

TRADE BAP MARK.

F. 106

A wonderful Time-saver

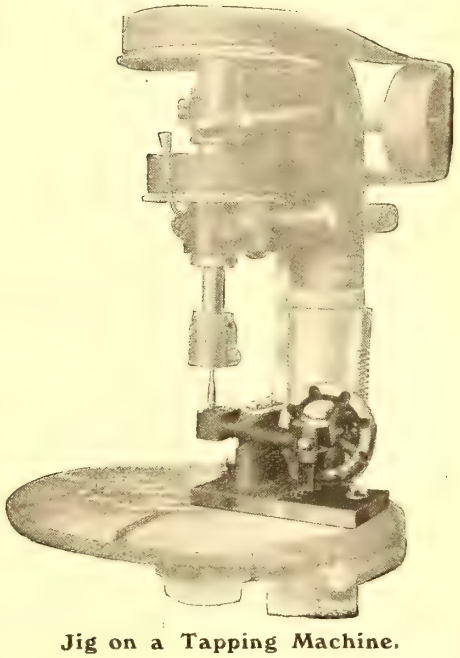


The BLACKBURN PATENT UNIVERSAL JIG *for* MILLING, TAPPING and DRILLING

Why waste time in making a Jig for each job?

The Blackburn Universal Jig has been specially designed to meet emergencies which arise in milling, tapping and drilling. It is always ready, and secures accuracy and quicker output.

Half a turn of the hand-wheel releases the fitting.



Jig on a Tapping Machine.

Price and further particulars on application direct to **The Proprietors, BLACKBURN AIRCRAFT PRODUCTS,** 30 Norfolk St., London, W.C.2

Blackburn AIRCRAFT

Steele's Ad. Serv.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

temp. commn. as Lt. (Hon. Capt.), May 22nd; R. J. Whitley (temp. Sec. Lt., R. Suss. R.), and is granted a temp. commn. as Sec. Lt., May 23rd; Sec. Lt. H. T. H. Copeland, May 27th.

L. Abraham to be Admin. Lt. (from Obsr. Lt.), May 10th.

The follg. are granted temp. commns. as Sec. Lts.:—A. G. Thomson (Lt., E. Surr. R., T.F.), and to be Hon. Lt., April 2nd; J. Parker (Qrmr. and Hon. Lt., Trg. Res. Bn.), and to be Hon. Lt., April 9th.

C. C. Clark (Capt., S.A. Pay Dept.) is granted a temp. commn. as Lt. (Admin.), and to be Hon. Capt., April 6th.

Temp. Sec. Lts. (late Equipt. Officers, 3rd Cl., on probation, R.F.C.) are confirmed in their rank as temp. Sec. Lts. (Admin.):—A. E. Simmonds, April 15th; R. Guy, April 17th.

A. W. Howard is granted a temp. commn. as Sec. Lt., May 1st.

Temp. Sec. Lts. (late Equipt. Officers, 3rd Cl., on probation, R.F.C., Gen. List) are confirmed in their rank as temp. Sec. Lts. (Admin.):—F. Salmon, April 3rd; N. C. Raffin, R. D. Smith, E. S. Robson, G. R. Rankine, April 24th; W. R. Westland, May 11th; W. L. Eveleigh, A. K. Murray, May 16th.

The follg. are granted temp. commns. as Sec. Lts. (Admin.):—O. T. Moran (Capt., Canadian A.S.C.), and to be Hon. Capt., A. A. McLachlan (Capt., Sea. Highrs.), and to be Hon. Capt., R. Blackith (Qrmr. and Hon. Lt., Gen. List), and to be Hon. Lt., J. Ballie, M.C. (Lt., High. L.I., T.F.), and to be Hon. Lt., J. Cobley (Lt., Middx. R., T.F.), and to be Hon. Lt., J. J. Galvin (Qrmr. and Hon. Lt., Gen. List), and to be Hon. Lt., R. O'Brien (Lt., Training Res. Bn.), and to be Hon. Lt., T. W. A. Jackson (temp. Sec. Lt., A.S.C.), W. Yarwood (Sec. Lt., Manch. R., T.F.), E. R. Cox (temp. Lt., Wilts. R.), April 24th.

Lt.-Col. G. W. S. Aldwell (Eng. Comdr., R.N.) relinquishes his commn. on account of ill-health contracted on active service, June 5th.

Capt. W. B. Hellard relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Capt., June 5th.

Sec. Lt. H. Bradley relinquishes his commn., May 15th.

Sec. Lts. resign their commns.:—A. S. Hitching, C. W. McKissock, June 5th.

Sec. Lt. H. R. Donovan (Sec. Lt., R.A.) relinquishes his commn. on account of ill-health contracted on active service, June 5th.

Sec. Lt. C. G. Hinder relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lt., June 5th.

The follg. officers of the R.D.C. (T.F.) are granted temp. commns. as follows, dated May 14th:—As Lt.-Col.—C. F. Campbell, C.I.E. As Capts.—C. G. Toswill, B. M. B. H. Gyll-Murray, R. C. Campbell, R. C. Bacon, W. F. Shakespear, R. S. C. de Chaffey. As Lts.—W. Rickets, H. F. Roberts, W. A. Dewhurst, J. R. M. Tweddell, J. R. Fox, H. H. Bunn, W. J. Hipkin, H. R. M. Dodd.

Technical Branch.—Lt.-Col. L. F. Blandy, D.S.O., is granted the temp. rank of Col. without the pay and allces. of that rank while specially empld., May 21st.

To be temp. Majs. while empld. as Majs. (Tech.):—Lt. (temp. Capt.) F. G. Brown, Capt. F. R. Williams, May 20th.

P. Colbeck (Capt., N'land Fus.) is granted a temp. commn. as Lt. (Hon. Capt.) while empld. as Lt. (Tech.), May 2nd.

Capt. (temp. Maj.) A. E. Loxley reverts to the rank of Lt. at his own request, and relinquishes the temp. rank of Maj., May 20th.

Sec. Lts. to be temp. Lts. while empld. as Lts. (Tech.):—E. H. Trump, April 5th; J. Smallbone, April 23rd; S. G. G. Ashley, J. N. Poyntz, May 1st; (Hon. Capt.) H. M. Fulton, May 11th; G. E. Bower, June 1st. The follg. are granted temp. commns. as Sec. Lts.:—H. H. Mitchell (Sub-Lt., R.N.V.R.), and to be Hon. Lt., F. N. Newell-Roberts (A./Lt., R.N.V.R.), and to be Hon. Lt., C. H. Welsh (Sub-Lt., R.N.V.R.), and to be Hon. Lt., H. W. Campion (Flt. Lt., R.N.A.S.), and to be Hon. Capt., G. W. Robinson (Sub-Lt., R.N.V.R.), and to be Hon. Lt., H. Gray (Sub-Lt., R.N.V.R.), and to be Hon. Lt., April 13th; P. S. Burnay (Sub-Lt., R.N.V.R.), and to be Hon. Lt., W. M. Stace (Sub-Lt., R.N.A.S.), and to be Hon. Lt., E. G. Symonds (Sub-Lt., R.N.A.S.), and to be Hon. Lt.; F. S. S. Calthorpe (Sub-Lt., R.N.V.R.), and to be Hon. Lt., C. A. Hurst (Sub-Lt., R.N.V.R.), and to be Hon. Lt., W. J. Metcalfe (Sub-Lt., R.N.A.S.), and to be Hon. Lt., G. Smart (Sub-Lt., R.N.A.S.), and to be Hon. Lt., C. E. Devas (Sub-Lt., R.N.V.R.), and to be Hon. Lt., W. T. Kannar (Sub-Lt., R.N.A.S.), and to be Hon. Lt., May 8th.

Memoranda.—Maj. G. P. Grenfell, D.S.O., to be temp. Lt.-Col. without the pay and allces. of that rank while specially empld., May 29th.

D. W. Dawson, late Sec. Lt., is granted the hon. rank of Sec. Lt., May 4th.

Lts. relinquish their commns. on ceasing to be empld.:—J. Sturrock (Sec. Lt., Fife and Forfar Yeo.), April 20th; J. B. F. Austin (Lt., temp. Capt., Hrs.), May 22nd.

War Office, June 5th.

REGULAR FORCES.—Establishments. — R.F.C. — Mil. Wing.—Schools of Instrn.—Schools of Mil. Aeronautics.—Examining Officer (Graded as a Flt. Comdr.)—Rank and corps of Sec. Lt. W. H. Dolphin, Ind. Army Res. Officer, is as now described, and not as in "Gazette" of Jan. 14th.

Admiralty, June 7th.

The King has been pleased to approve of the award of the following decorations and medal to officers and men of the Royal Naval Air Service:—

The Distinguished Service Cross.

Flt. Lt. John Gamon, R.N.A.S.

For conspicuous gallantry and devotion to duty. On March 30th, 1918, whilst returning from a bombing raid, he was attacked by three enemy triplanes, one of which he brought down and drove off the other two. He has carried out very many bombing raids on enemy lines of communication, aerodromes, and dumps. His work has always been of the greatest merit, and he has set a splendid example to those around him.

Flt. Sub-Lt. G. B. McBain, R.N.A.S.

For conspicuous bravery and devotion to duty in carrying out bombing raids on enemy troops, aerodromes, and lines of communication. On March 18th, 1918, while returning from bombing an enemy aerodrome, he was attacked by five enemy scouts. After a short combat one of the scouts was seen to nose-dive, and its tail plane fell off. The four other enemy aircraft retired. He has carried out many bombing raids, at all times showing great determination and setting a splendid example.

A Bar to the Distinguished Service Cross.

Flt. Lt. (actg. Flt. Comdr.) L. H. Rochford, D.S.C., R.N.A.S.

For consistent determination, bravery, and skill. As a Flt. Comdr. he has shown considerable ability, and has always set a fine example when dealing with enemy aircraft. On March 21st, 1918, when on offensive patrol, he attacked one of nine Albatros scouts. Enemy aircraft was seen to go down in the mist out of control. He has destroyed or driven down out of control many other enemy machines.

Flt. Lt. (actg. Flt. Comdr.) C. R. Lupton, D.S.C., R.N.A.S.

For conspicuous bravery and skill in leading bombing formations, especially on March 26th, 1918, when he carried out at low altitudes four bombing raids on enemy communications. In the course of these raids he caused great damage to enemy transport, and inflicted serious casualties on large numbers of their reinforcements. He has carried out very many bombing raids, and by his courage and resource has instilled a spirit of confidence and daring in all those who have flown with him.

Flt. Lt. J. A. Glen, D.S.C., R.N.A.S.

For exceptional gallantry and skill as a flight leader when engaging enemy aircraft. He has destroyed or driven down out of control many enemy machines.

A Bar to the Distinguished Service Medal.

Air Mech., 1st Gr., W. Naylor, D.S.M., O.N., F1406.

* * *

The following officer has been mentioned in despatches:—
Flt. Lt. H. C. Lemon, R.N.A.S. (killed).

* * *

The following decoration has been conferred by an Allied Power on the following officer of the British Naval Forces for distinguished services rendered during the War. The King has given unrestricted permission to wear the decoration in question:—

Conferred by the King of the Hellenes.

Order of the Redeemer.

Fourth Class.

Wing Comdr. (actg. Wing Capt.) R. Gordon, D.S.O., R.N.A.S. (Maj. Temp. Lt.-Col. R.M.L.I.).

Correction.

In "Gazette" of May 1st, 1918, page 5,281, col. 2, for Flt. Lt. Charles Henry Fitzherbert, R.N.A.S., read Flt. Lt. Cecil Henry Fitzherbert, R.N.A.S.

War Office, June 7th

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing.—Spec. Appt.—(Graded as a Park Comdr.).—Temp. Lt. (temp. Capt.) J. Stewart, R. Sco. Fus., from a spec. appt. (graded as Equipt. Officer, 1st Cl.), and to be temp. Maj. whilst so empld., March 13th.

Equipt. Officers, 1st Cl.—Temp. Lt. W. G. M. Nicholl, Gen. List, from the 2nd Cl., and to be temp. Capt. whilst so empld. March 1st.

Experimental Officer, 1st Cl.—(Graded as an Equipt. Officer, 1st Cl.).—The appt. of temp. Lt. W. G. M. Nicholl, Gen. List, notified in "Gazette" of April 29th, is cancelled.

Oversea Contingent.—British Columbia R.—Temp. Lts. to be temp. Capts.:—G. E. G. Craig (and to remain secd. to R.A.F.). Feb. 11th.

Air Ministry, June 7th.

R.A.F.—The follg. temp. appts. are made at the Air Ministry:—

Staff Officers, 1st Cl.—Lt.-Col. R. C. Donaldson-Hudson,

MANN EGERTON & Co.Ltd.

CONTRACTORS TO H.M. ADMIRALTY,
WAR OFFICE AND AIR MINISTRY.

Designers and Manufacturers of Proved Efficiency of all Types of AIRCRAFT

Head Office : NORWICH

SPECIAL DEPARTMENT
for the manufacture of
AIRCRAFT ACCESSORIES
(Strainers, Bolts and Nuts, etc., etc.)
177, CLEVELAND ST., LONDON, W.1.

MANN EGERTON & Co.Ltd.

LONDON NORWICH IPSWICH BURY ST. EDMUNDS.

D.S.O., April 1st; Capt. (temp. Maj.) R. Holloway, and to be temp. Lt.-Col. whilst so empld., vice Lt. (temp. Lt.-Col.) R. W. Roylance, May 15th.

Staff Officers, 2nd Cl.—And to be temp. Maj. if not already holding that rank:—Capt. (temp. Maj.) E. H. Cockburn, April 1st. (Substituted for notification in the "Gazette," April 2nd.) Capt. H. K. Maxwell, May 5th; Lt. (temp. Capt.) P. C. Simmons, vice Lt. (temp. Maj.) H. P. Maybury, May 19th; Sec. Lt. A. R. Fulton, May 20th. (Substituted for notification in the "Gazette," May 28th.)

Staff Officer, 3rd Cl.—Lt. E. A. Mayner, and to be temp. Capt. whilst so empld., vice Capt. (temp. Maj.) C. R. Andrews, May 13th.

Staff Officer, 4th Cl.—Lt. H. D. Savory, May 13th.

The follg. temp. appts. are made:—Staff Officer, 1st Cl.—Lt. (temp. Maj.) F. S. Isaac, and to be temp Lt.-Col. whilst so empld., May 22nd.

Staff Officers, 2nd Class.—And to be temp. Maj. if not already holding that rank. Lt. (temp. Capt.) W. L. Birch, April 1st. (Substituted for notification in the "Gazette," May 10th.) Capt E. P. Stapleton, April 1st; Capt. C. C. Boyd-Rochfort, April 21st; Lt. (temp. Maj.) P. S. J. Owen, and to retain his temp. rank whilst so empld., May 23rd.

Staff Officers, 3rd Cl.—And to be temp. Capts. if not already holding that rank:—Lt. G. H. A. Hawkins, April 1st; Lt. (temp. Capt.) G. W. Dobson, May 8th; Lt. L. Tunks, May 14th; Lt. A. H. King, May 15th.

Flying Branch.—Capt. J. Everidge to be temp. Maj. whilst empld. as Maj. (A. and S.), May 23rd.

Lt. (temp. Capt.) S. O. Smith to be temp. Maj. whilst empld. as Maj. (K.B.), May 24th.

Lts. (Hon. Capts.) to be temp. Capts. whilst empld. as Capts. (A. and S.):—J. W. Pinder, May 13th; G. D. Smith, D.S.C., H. V. Worrall, May 21st; W. G. R. Hinchliffe, May 29th.

Lts. to be temp. Capts. whilst empld. as Capts. (A. and S.):—H. L. Rough, May 19th; D. Latimer, H. W. L. Saunders, May 25th; G. B. Bailey, H. C. Cooke, J. E. Middleton, May 29th; S. N. Pike, May 31st; H. C. Chambers, June 1st.

Sec. Lts. to be temp. Capts. whilst empld. as Capts. (A. and S.):—J. A. Gray, May 26th; G. W. Bulmer, May 29th.

Temp. Sec. Lts. (late Gen. List, R.F.C., on probation) to be confirmed in their rank as temp. Sec. Lts. (A. and S.):—A. N. Westergaard, April 6th; M. Tison, April 12th; E. H. Weatherall, H. M. Smith, April 13th; W. Dawson, April 21st; S. G. Groom, April 29th; H. Thomas, C. A. L. Coutts, R. Jones, May 2nd; N. C. Scott, B. Cohen, N. J. Nock, W. Allen, May 3rd; J. Cornyn, L. W. Pooley, May 4th; J. C. Joynt, P. Reed, May 5th; E. S. Farrand, A. S. Middleton, F. Stanley, I. B M. McCulloch, L. R. Marsh, H. A. Morton, N. C. Waltho, May 6th; A. E. Parks, A. E. Brealey, R. G. Langmead, R. W. Barton, J. T. R. Proffitt, S. L. Horsman, C. W. G. McIntyre, May 7th; T. H. Pyke, G. Martin, W. M. Wormald, M. W. C. Ridgway, B. C. Kerr-Bayly, G. C. C. Carr-Harris, J. E. Watts, A. H. Bliss, H. J. L. Jones, J. Caldwell, L. Leeming, W. Dougall, J. S. Wheatcroft, A. K. Shufflebotham, D. Stevenson, R. E. Stevens, F. H. N. Sessions, E. T. Treglown, May 8th; R. W. A. Watchorn, P. J. Bayly, J. G. Galbraith, C. F. Grant, G. Rowell, M. S. O'Rorke, W. B. Newth, O. M. Turnbull, W. W. Langdon, W. C. Goudie, J. V. Price, F. F. Anslow, L. A. Durrant, May 9th; J. McRobert, M. D. Sinclair, H W. Burry, J. C. Dalton, G. S. Scott, H. J. Ewan, T. Allan, H. C. Curtis, P. C. Moynihan, A. C. New, J. Cameron, L. K. Davidson, W. Goffe, R. A. H. Brittain, May 10th; G. Norris, A. Wren, A. H. Fraser, H. J. Heddle, K. D. Handel, S. J. R. Smith, L. C. Pitts, T. H. Wright, C. S. Dunbar, R. N. Wellington, May 11th.

F. W. K. Davies, from Maj. (Tech.) to be temp. Sec. Lt. (A. and S.), and to be Hon. Maj., May 10th.

Temp. Lt. (Hon. Capt.) L. E. Barry (Obsr. Officer), to be temp. Lt. (Hon. Capt.), A. and S., May 6th.

Temp. Lts. (Obsr. Officers) to be temp. Lts. (A. and S.):—W. Adamson, May 8th; F. Leathley, May 11th.

The following are granted temp. commns. as Sec. Lts., A. and S.:—L. C. Rowney (temp. Lt., Middx. R.), and to be Hon. Lt., May 1st; H. Gordon (Lt., Ches. R., T.F.), and to be Hon. Lt., May 2nd; C. H. N. Ashlm (Lt., E. Yorks Yeo., T.F.), and to be Hon. Lt.; W. Wilson (Sec. Lt., Liverpool R., T.F.), May 6th; W. Southworth (Sec. Lt., N. Lancs R., T.F.); A. S. Wilcockson (temp. Sec. Lt., Middx. R.); A. L. Pink (Sec. Lt., Rif. Brig.); J. Graham (temp. Sec. Lt., Res. R of Cav.); T. W. Laybourne, D.C.M. (Lt., Saskatchewan R., C.E.F.), and to be Hon. Lt., May 8th; T. H. Langrishe (Sec. Lt., I. Gds.), A. C. Lobley (Lt., E. Ontario R., C.E.F.), and to be Hon. Lt., D. G. Williams (temp. Lt., Suff. R.), and to be Hon. Lt., May 9th; G. S. Tunstall (Lt., Manitoba R., C.E.F.), and to be Hon. Lt., T. Wishart (temp. Sec. Lt., attd. Gordon Highrs.), May 11th; T. M. Harries, June 1st; P. H. Bridges, A. R. Coppin, June 10th.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) to be confirmed in their rank as temp. Sec. Lts.. Obsr. Officers:—H. M. Stewart, April 1st; N. Sillars, April 3rd; K. Preston, R. T. North, April 4th; R. Miller, April 6th; A J. Ord, April 7th; S H. Spencer, L. W. Jameson, E. Grayson, April 9th; G. N. Lloyd-Rees, J. J. Mackenzie, April 10th; F. A. L. Sear, L. W. Norman, W. K. J. Shirlaw, April 11th; C. Sunderland, April 12th; A. Fleming, April 13th.

Administrative Branch.—The following to be temp. Majs. while empld. as Admin. Majs.:—Lt. (Hon. Capt.) L. C. Coates, Capt. W. G. Scott, April 1st; Capt. A. H. Parker, May 20th.

A. P. Frankland, D.S.O. (Maj., Res. of Officers), is granted a temp. commn. as Maj., April 1st; F. T. Chapman (Lt., Lond. R., T.F.) is granted a temp. commn. as Lt., and to be temp. Maj. while empld. as Admin. Maj., April 1st.

Lts. to be temp. Capts. while empld. as Admin. Capts.:—J. E. H. Bibby, T. F. Davis, S. T. Grant, April 1st.

Sec. Lts. to be temp. Capts. while empld. as Admin. Capts.:—G. I. Fry, J. W. Gardner, R. Tait (Hon. Lt.), G. E. L. Woodhouse, April 1st; S. Morris, April 29th.

F. K. Jones (Capt., Lond. R.) is granted a temp. commn. as Capt., April 6th; C. L. H. Dickinson (Lt., Leic. R.) is granted a temp. commn. as Lt., and to be temp. Capt. while empld. as Courts-martial Officer, May 7th.

Sec. Lts. to be temp. Lts. while empld. as Admin. Lts.:—G. E. Smith, April 3rd; W. H. Botterill, May 18th.

K. Mackenzie to be Admin. Lt., from A and S. Lt., April 9th. G. C. Cheshire to be Admin. Lt., from K.B. Lt., May 15th; R. T. Kelly (temp. Lt., Liverpool R.) is granted a temp. commn. as Lt., April 1st. (Substituted for notification in "Gazette" May 17th.)

The following are granted temp. commns as Lt.:—W. H. Charlton (Capt., Northd. Fus.), and to be Hon. Capt., L. C. Russell (temp. Lt., R. Fus.), April 3rd; G. W. Rogers (Capt., N. Staffs. R.), and to be Hon. Capt., April 6th; R. Godfrey (Lt., temp. Capt., R.G.A., T.F.), and to be Hon. Capt., April 22nd; R. D. Bridgewater (temp. Lt., E. Surr. R.), April 24th; E. V. Bashford, May 2nd; B. A. Clay (temp. Lt., Res. R. of Cav.), May 11th; G. Malone (Lt., R. Ir. R.), F L. de Sales La Terrière, May 24th.

The following are granted temp. commns. as Sec. Lts. Admin.):—E. Bentley, S. C. Bicknell, J. R. Bonnet, B. B. Brown, A. F. B. Cannon, L. V. E. Charlton, W. F. Dean, A. B. Evans, J. S. Ferguson, R. E. Finch, J. S. Forde, W. H. Frame, C. W. Gordon, W. Haddon, R. Holland, F. C. Howe, H. T. Kay, S. W. D. Leake, J. E. Lewis, A. Lindsay, J. Mackay, E. Martin, J. R. McDonald, A. C. Merriel, H. T. Miles, T. B. Nelson, R. F. Nicholls, F. E. Openshaw, W. L. Oxley, D. T. Paine, J. W. Pegg, A. F. Potter, D. Rawley, R. L. Raymond, F. S. Read, J. Ross, W. Seed, N. W. Seyler, A. C. Smart, R. P. C. Taylor, W. E. Truman, R. V. Weeks, R. G Wells, E. A. Williams, C. Wormleighton, May 22nd; H. Balls, W. E. Burden, A. S. Crosby, J. A. Elliott, H. R. Moffatt, F. A O'Brien, H. A. Read, H. W. Richardson, T. H. Storer, A. D. Watts, B. Williams, A. F. Wilson, June 1st; J. J. Evans, June 3rd; C. W. Edwards, N. J. S. Revington, June 5th; A. V. Scholes, F. C. Warren, June 6th.

Temp. Sec. Lt. W. D. Littlewood, R.F.A., is granted a temp. commn. as Sec. Lt., April 7th; H. M. Woodhouse, (Lt., Notts Yeo., T.F.), to be temp. Sec. Lt., and to be Hon. Lt., May 11th.

The following temp. Sec. Lts. (late Equipt. Officers, 3rd Cl. Gen. List, R.F.C., on probation) are confirmed in rank as temp. Sec. Lts. (Admin.):—R. Carr, E. J. Crowe, A. J. Evans, A. M. Langdale, E. H. MacHenery, April 4th; J. E. Carter, F. A. Skoulding, H. E. Shaw, H. F. J. Taylor, H. E. Taylor, April 25th; A. J. Miller, April 26th.

Lt. A. A. Vandyke (Lt. Lond. R., T.F.) relinquishes his commn. on acct. of ill-health contracted on active service, June 8th.

Technical Branch.—Capt. H. A. P. Disney to be temp. Lt.-Col. while empld. as Lt.-Col., May 28th; Capt. W. J. B. Curtis to be temp. Maj. while empld. as Maj., April 1st; Sec. Lt. E. C. Robinson to be temp. Lt. while empld. as Lt., May 26th; W. E. Jones to be Sec. Lt., from Lt. (A. and S.), and to be Hon. Lt., June 1st; Temp. Sec. Lt. (Admin.) to be temp. Sec. Lt.:—A. J. Williamson, May 4th; J. G. Russell (Capt., R. Scots Fus., T.F.) is granted a temp. commn. as Sec. Lt., and to be Hon. Capt., May 18th; Sec. Lt. F. C. Pratt resigns his commn., June 8th.

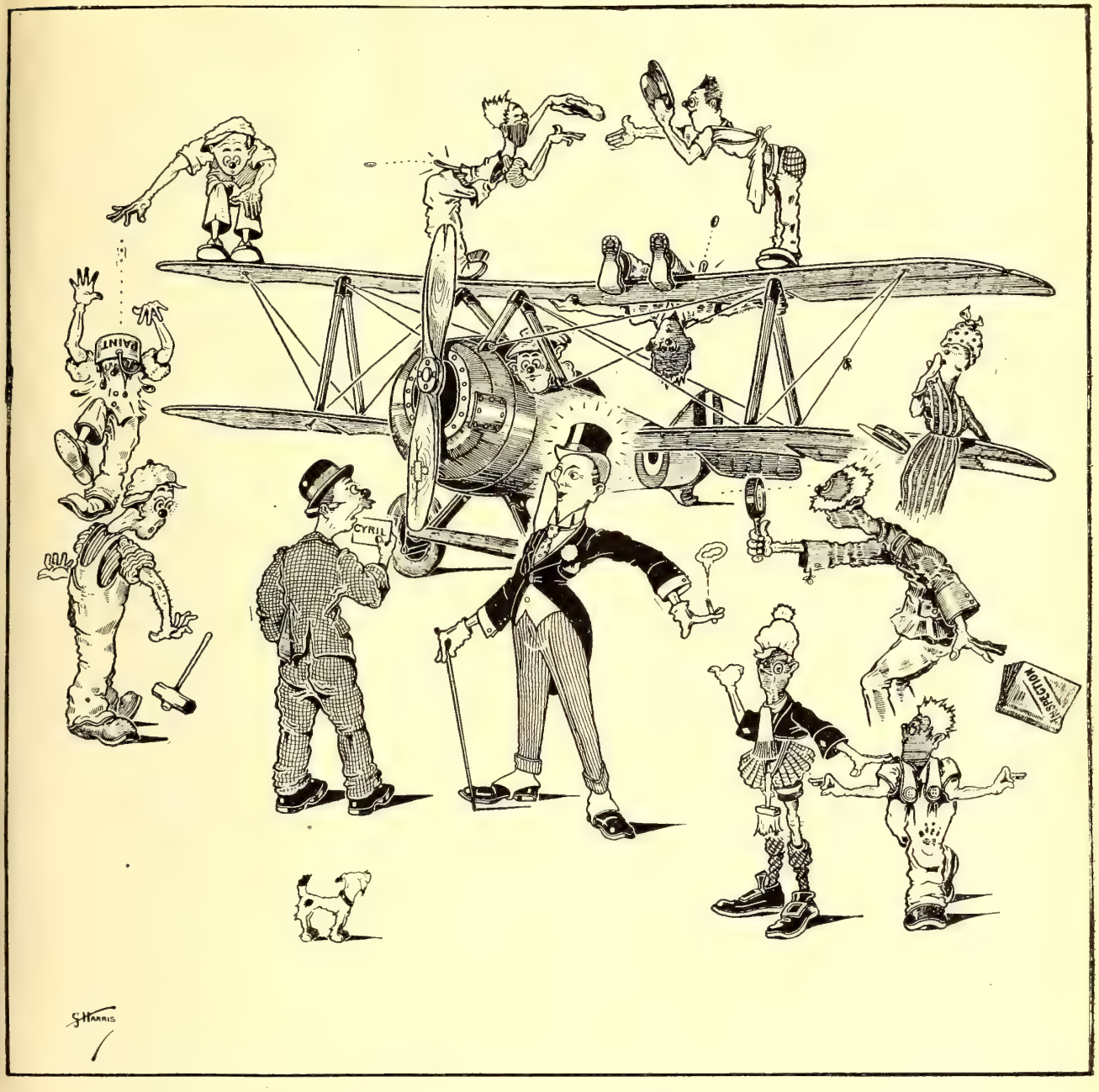
Medical Branch.—H. Pritchard (temp. Maj., R.A.M.C.) is granted a temp. commn. as Maj., May 2nd (substituted for notification in the "Gazette" May 28th).

The following are granted temp. commns. as Capts.:—J. MacGregor, May 23rd; E. H. Hogg, F. Rogerson, June 6th; W. L. Scott, June 10th.

The following are granted temp. commns. as Lts.:—G. Bourne, O. F. Conoley, L. C. Broughton-Head, G. H. Johnson, C. Murray-Shirreff, H. T. Prys-Jones, H. W. Toms, H. B. Troup, June 6th; R. T. Williams, June 7th; J. J. Savage, June 8th.

Memoranda.—Maj. (temp. Lt.-Col.) C. F. Lee to be temp. Brig.-Gen. while specially empld., June 1st.

The following Lt.-Cols. are granted the temp. rank of Col. while specially empld.:—R. H. C. Clark-Hall, R. C. S. Hunt, April 1st.



THE ADVENTURES OF "CYRIL" IN THE AVIATION WORLD

No. 1. He applies for a job at an Aircraft Factory

PINCHIN, JOHNSON & CO., *Limited*

Manufacturers of Approved Varnishes, Paints, and Colors for Aircraft Work.

Head Office: MINERVA HOUSE, BEVIS MARKS, LONDON, E.C.3.

Telephone: Avenue, 910, (3 Lines) Established 1834 *Telegrams: "Pinchin, Ald, London"*

Lt. J. Ferguson relinquishes his commn. on ceasing to be empld., May 13th.

The following are granted temp. commns. as Sec. Lts., Obsr. Officers :—J. P. Y. Dickey (Lt., Manch. R., T.F.), and to be Hon. Lt., April 1st; J. P. Jones (temp. Lt., S. Lancs. R.), and to be Hon. Lt., J. P. Bosman (Sec. Lt., R.F.A., Spec. Res.), W. E. Barnes (temp. Sec. Lt., Notts and Derby R.), S. Parry (temp. Sec. Lt., R.E.), April 4th; A. H. Waddy (Lt., Bedf. R.), and to be Hon. Lt., C. E. Jenkinson (Lt., R.F.A., Spec. Res.), and to be Hon. Lt., H. Haywood (temp. Sec. Lt., Oxf. and Bucks L.I.), F. Wood (temp. Sec. Lt., L'pool R.), P. V. G. Chambers (Sec. Lt., S. Staff. R., T.F.), H. G. Hooker (temp. Sec. Lt., Middx. R.), April 5th; R. D. Stewart (Sec. Lt., S. Staff. R., T.F.), April 8th; T. F. Harvey (Lt., Sea. Highrs., T.F.), and to be Hon. Lt., G. Cuttle, M.C. (Lt., R.F.A. Spec. Res.), and to be Hon. Lt., C. J. R. Gibson (Lt., Cam'n Highrs., T.F.), and to be Hon. Lt., April 9th; F. E. Gauntlett (temp. Lt., R. Berks R.), and to be Hon. Lt.; A. E. Ansell (Lt., Lond. R., T.F.), and to be Hon. Lt.; W. Hodgkinson (Sec. Lt., L'pool R., T.F.), H. F. Lumb (temp. Sec. Lt., W. Riding R.), C. S. Bissett (Sec. Lt., E. Kent R., Spec. Res.), W. F. Hanna (Sec. Lt., Cam'n Highrs., Spec. Res.), April 10th; E. W. Collis (Lt., Manch. R., T.F.), and to be Hon. Lt., H. C. Kent (Sec. Lt., Cav., Spec. Res.), April 11th; J. A. R. Andrews (temp. Sec. Lt., Lincs. R.), April 12th; H. J. Greenwood, M.C. (Sec. Lt., W. Yorks R., T.F.), April 13th; H. V. Thornton (Lt., Essex R., T.F.), and to be Hon. Lt., April 20th; F. J. Lain (Lt., Bord R., T.F.), and to be Hon. Lt., A. J. Rose (temp. Lt., attd. Worc. R.), and to be Hon. Lt., F. H. Chapple (temp. Sec. Lt., Norf. R.), M. McConville, M.C. (temp. Sec. Lt., W. York R.), H. Gittins (temp. Sec. Lt., S. Lancs. R.), N. Bowden, (Sec. Lt., Notts and Derby R., T.F.), April 22nd; D. R. Sharman, M.C. (temp. Lt., R. W. Surr. R.), and to be Hon. Lt., C. H. Stilwell (Lt., E. Surr. R.), and to be Hon. Lt., April 23rd; M. P. E. Harrison (Sec. Lt., E. Kent R.), April 24th; S. T. Jerome, M.C. (temp. Lt., R. Fus.), and to be Hon. Lt., M. T. Stanley (Sec. Lt., Middx. R., Spec. Res.), April 25th; J. C. Howells (Lt., Manch. R., T.F.), and to be Hon. Lt., April 26th; A. B. Mason (Maj., Nova Scotia R., C.E.F.), and to be Hon. Maj., F. Godfrey (temp. Capt., Middx. R.), and to be Hon. Capt., A. Mills (temp. Lt., Arg. and Suthd. Highrs.), and to be Hon. Lt., N. A. Smith (temp. Lt., Manch. R.), and to be Hon. Lt., R. W. Turner (temp. Sec. Lt., York R.), G. C. T. Salter, M.C. (Sec. Lt., E. York R.), P. G. Jones (temp. Sec. Lt., R.E.), April 27th; A. R. Evers (Lt., Can. F.A., C.E.F.), and to be Hon. Lt., C. H. Snow (Lt., Nova Scotia R., C.E.F.), and to be Hon. Lt., A. G. Fletcher (temp. Sec. Lt., R. War. R.), B. E. H. Whiteford, M.C. (Sec. Lt., R.F.A., Spec. Res.), April 28th; F. H. Allchurch (temp. Lt., R. War. R.), and to be Hon. Lt., R. P. Allday (temp. Lt., Shrops. L.I.), and to be Hon. Lt., H. G. Scott (temp. Sec. Lt., Oxf. and Bucks L.I.), J. G. Angus (Sec. Lt., High. L.I., T.F.), April 29th; L. A. Naylor (Lt., Nova Scotia R., C.E.F.), and to be Hon. Lt., S. N. Bourne (temp. Lt., R. Suss. R.), and to be Hon. Lt., I. R. L. Ross (temp. Sec. Lt., R. Ir. Rif.), April 30th; J. B. V. Clements (temp. Lt., R.F.A.), and to be Hon. Lt., E. W. Smith (Sec. Lt., Lond. R., T.F.), May 1st; J. A. G. Haslam (Lt., R.F.A.), and to be Hon. Lt., May 2nd; C. Le G. Amy (Lt., Saskatchewan R., C.E.F.), and to be Hon. Lt., G. Thomson (Lt., K.O. Sco. Bord.) (Spec. Res.), and to be Hon. Lt., A. G. H. Williamson (Sec. Lt., Norf. R., Spec. Res.), May 4th; J. F. Glennie (Lt., R.G.A.), and to be Hon. Lt., R. P. Keely (Sec. Lt., London R., T.F.), May 6th; A. M. F. Hill (temp. Capt., K.R.R.C.), and to be hon. Capt., H. F. Griffith (temp. Sec. Lt., Intelligence Corps), C. C. R. Millington (Sec. Lt., R.G.A., Spec. Res.), E. C. Richards (temp. Sec. Lt., R.W. Surr. R.), W. J. Stockins (Sec. Lt., Lond. R., T.F.), May 7th; I. R. G. Jones (Capt., Welsh R., T.F.), and to be Hon. Capt., W. C. Broadwood (Lt., Derby Yeo., T.F.), and to be Hon. Lt., May 8th; G. S. Grant (temp. Capt., attd. Leic. R.), and to be Hon. Capt., H. S. Winkworth (Lt., Dn. Gds., Spec. Res.), and to be Hon. Lt., L. C. D. Palmer (Sec. Lt., R.F.A.), May 9th; A. R. Watts, M.C. (Lt. Cam'n Highrs.), and to be Hon. Lt., T. C. Cooper, M.C. (temp. Sec. Lt., R. Lanc. R.), W. F. Nicholay, D.C.M. (Sec. Lt., E. York. R.), May 10th; F. Ambler (temp. Lt., W. York R.), and to be Hon. Lt., L. J. F. Oertling (Lt., Bedf. R., T.F.), and to be Hon. Lt., W. S. Gregor (temp. Sec. Lt., High. L.I.), May 11th; P. H. Dixon (Sec. Lt., R.F.A., Spec. Res.), W. H. Stanley (temp. Sec. Lt., R. Fus.), May 12th; J. F. D. Tanqueray (Lt., Canadian Engineers, C.E.F.), and to be Hon. Lt., E. G. Pernet (temp. Lt., Bedf. R.), and to be Hon. Lt., T. C. Danby (Sec. Lt., York Hussars Yeo., T.F.), H. L. B. Crabbe (Sec. Lt., Hussars), May 13th; L. G. Radcliffe (temp. Sec. Lt., Manch. R.), May 14th; W. H. Lyell (Lt., Gord. Highrs., Spec. Res.), and to be Hon. Lt., W. Miller (temp. Lt., Northd. Fus.), and to Hon. Lt., G. J. Gaynor (Sec. Lt., S. Irish Horse Cav., Spec. Res.), F. L. Norden (Spec. Lt., R. Scots), W. S. Chrystal (temp. Sec. Lt., attd. K.R.R.C.), May 15th; C. P. Domegan (Sec. Lt., R. Ir. Fus., Spec. Res.), May 16th; R. M. Hall (Lt., Quebec R., C.E.F.), and to be Hon. Lt., C. P. Harrison (temp. Lt., R.E.), and to be Hon. Lt., H. A. Lamb (temp. Lt., Res. R. of Cav.), and to be Hon. Lt., G. D. Dardis (Lt., Can. Forestry Corps), and to be Hon. Lt., J. F. A. Hall (Lt., E. York R.), and to be Hon. Lt., F. A. Shaw, M.C. (Sec. Lt., Lanc. Fus., T.F.), F. W. Roadhouse (temp. Sec. Lt., York and Lan. R.), May 17th; J. H. M. Yeomans, M.C. (Lt., N. Staff. R., T.F.), and to be Hon. Lt., A. J. Todd (Sec. Lt., N. Staff. R., T.F.), W. Spencer (Sec. Lt., Manch. R., Spec. Res.), C. G. Gass (Sec. Lt., Lond. R., T.F.), H. E. Elsworth (temp. Sec. Lt., York and Lanc. R.), May 18th; W. A. B. Eastwood (temp. Lt., E. York R.), and to be Hon. Lt., May 19th; R. L. Rice (Lt., R. Dub. Fus.), and to be Hon. Lt., T. E. L. Elliott (Sec. Lt., Camo. R., T.F.), May 20th; G. R. Thornley (Lt., Lanc. Fus., Spec. Res.), and to be Hon. Lt., C. F. Ambler (temp. Sec. Lt., R. Ir. Fus.), A. G. Lawe (Sec. Lt., Linc. R.), D. Bo (temp. Sec. Lt., Notts and Derby R.), May 21st, A. I. William (Lt., Mon. R., T.F.), and to be Hon. Lt., J. Garrett (Lt., Lord Strathcona's Horse, C.E.F.), and to be Hon. Lt., G. N. Seller (temp. Sec. Lt., attd. W. York R., May 22nd; T. Pim (Lt. R.F.A.), and to be Hon. Lt., H. F. Gorman (temp. Lt., Hamps R.), and to be Hon. Lt., C. V. Todman (Lt., Lond. R., T.F.), and to be Hon. Lt., W. T. Ganter (Sec. Lt., R. Berks R., Spec Res.), E. H. Ralling (Sec. Lt., R.F.A., Spec. Res.), J. E. Pill ing (Sec. Lt., Lpool. R., T.F.), M. G. Penny (Sec. Lt., R.G.A., May 23rd, E. D. Spencer (Lt., Can. Rly. Services, C.E.F.), an to be Hon. Lt., W. H. Delamere (Sec. Lt., Lpool. R., T.F.) May 25th.

Temp. Lt. (Hon. Capt.) F. T. R. Kempster (K.B.) to be temp Lt., Obsr. Officer, and to retain hon. rank as Capt., May 1st.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) to be con firmed in their rank as temp. Sec. Lts., Obsr. Officers :— T. J. Wilson, J. A. Cogan, April 29th; J. A. Tomlinson, May 3rd W. D. Davidson, May 4th; J. Lumsden, A. T. Sprangle, J. C Fitton, May 6th; G. A. Drewitt, May 9th; G. E. Davies, J. W Whitmarsh, May 11th; H. L. Page, May 13th; F. A. Gledhill May 14th; W. R. Gray, T. W. Brockley, F. H. Perry, Ma 15th; D. R. Goodie, A. Taylor, May 17th; A. T. Streeter, L. C J. Barlow, J. H. Umney, May 18th; H. Pullan, May 20th; A H. Harrison, G. W. Elias, F. N. Brace, D. P. Conyngham, Ma 21st; W. A. Tagg, May 22nd, R. W. Brigstock, May 23rd.

Temp. Sec. Lt. H. G. Herbert (late Gen. List, R.F.C.) to b Sec. Lt., Obsr. Officer, April 28th.

The follg. Cadts are granted temp. commns. as Sec. Lts (Obsr. Officers) :—F. H. Foster, April 27th; F. Allen, S. J West, L. F. Rowsell, W. Knowles, S. Chandler, L. Eastwood May 23rd.

The follg. Cadets are granted temp. commns. as Sec. Lts. K.B. :—A. C. Blackburn, F. D. Wilkinson, May 13th; F. M Grey, May 20th.

Lt. R. J. W. Sawbridge relinquishes his commn. on accoun of ill-health contracted on active service, and is granted the hon rank of Lt., June 8th.

War Office, June 8th.

REGULAR FORCES.—Establishments. — R.F.C. — Mil. Wing.—Flt. Comdr.—The rank of temp. Capt. G. E. F. Sutton M.C., Canadian Local Forces, is now as described, and not as in the "Gazette" of Aug. 22nd, 1917.

Instr. in Gunnery.—(Graded as an Equipt. Officer, 1st Cl.).—The date of appt. of Sec. Lt. P. H. R. Whittet, M.C., Spec. Res. notified in the "Gazette" of May 11th is March 24th, 1917.

Gen. List.—Sec. Lt. G. Oliver to be temp. Capt. while empld as a Section Comdr., Res. Depot, Jan. 15th.

War Office, June 10th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing —Staff Officer, 3rd Cl.—Graded as a Staff Capt.—Temp. Lt. J. S. Webb, Gen. List, from a Flying Officer (Obsr.), and to be temp. Capt. while so empld., March 1st.

Gen. List.—To be temp. Sec. Lts. :—3rd Cl. Air Mech. C. Wilson, from R.F.C., Feb. 12th; Pte. H. Reeves, from A.S.C., Feb. 18th.

Temp. Lt. C. W. T. Riley, Gen. List, to be temp. Capt. (without the pay or allowances of that rank) while actg. as Adjt., vice Temp. Lt. J. S. Curtis, Gen. List, who relinquishes the temp. rank of Capt., March 20th.

FROM THE COURT CIRCULAR.

Royal Pavilion,
Aldershot Camp, June 7th.

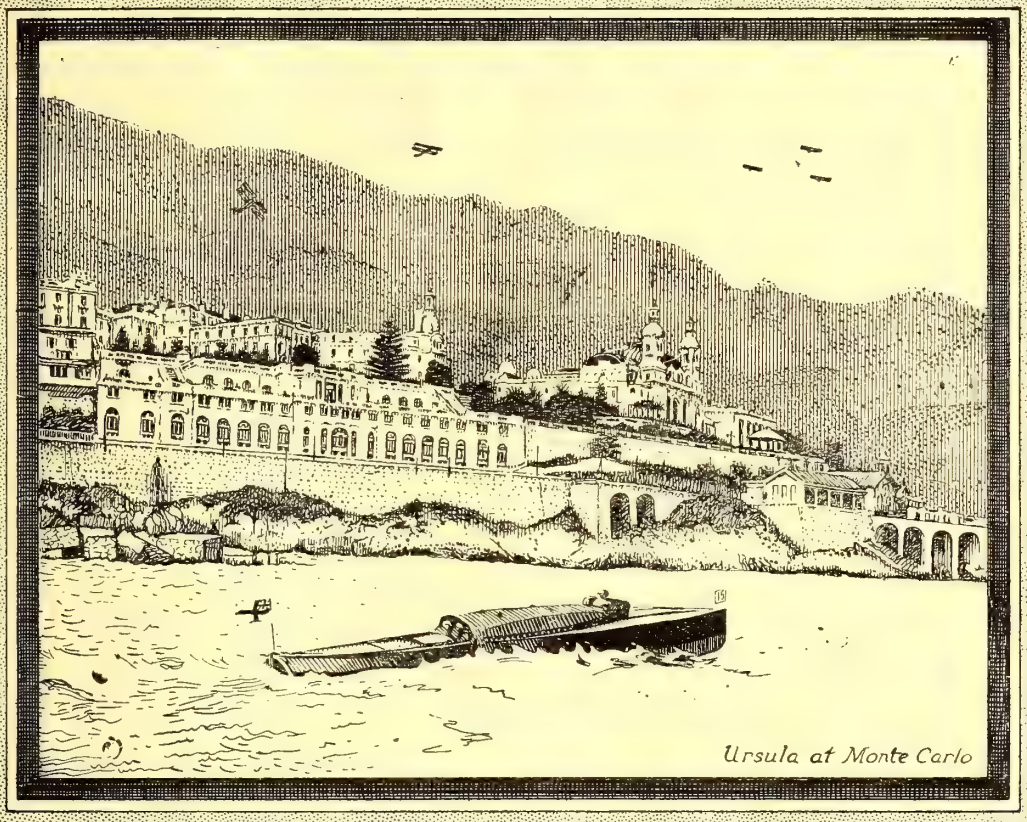
The King and Queen and Field-Marshal the Duke of Connaught, attended by the Ladies and Gentlemen in Waiting, inspected Establishments of the Royal Air Force this afternoon.

Royal Pavilion,
Aldershot Camp, June 8th.

The King, accompanied by the Queen, the Princess Mary, and Field-Marshal the Duke of Connaught, and attended by the Ladies and Gentlemen of the Households in Waiting, proceeded to the Queen's Parade, Aldershot Camp, this morning, for the purpose of holding an Investiture. His Majesty conferred decorations as follows :—

The Military Cross.—Lt.-Col. J. Mead, R.A.F.; Lt. T. Macaulay, R.F.A., attd. R.A.F.; Lt. R. Andrews, Can. M.R., attd.

(*Continued on page 2195.*)



Ursula at Monte Carlo

SAUNDERS of COWES

S. E. Saunders, Ltd.

Designers & Constructors of Air & Marine Craft

EAST COWES. I.W.

Telegrams "Consuta" E Cowes.
Phone Cowes 193. (4 Lines)

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTION
SB AC

SUNBEAM-COATALEN AIRCRAFT MOTORS

"AMONGST others, these include the celebrated bombing machines of Handley Page, a type of machine that the Sunbeam - Coatalen engines have made possible, and which have been of incalculable service to ourselves and our Allies in the War."

From "MOTOR NEWS," *April 20th.*

THE SUNBEAM MOTOR CAR CO., LTD., WOLVERHAMPTON.

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 5456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co. Ltd

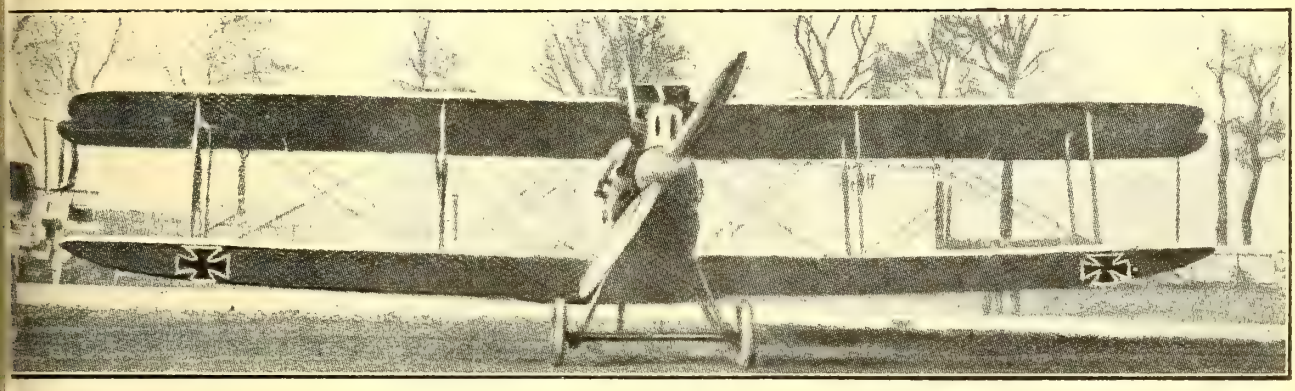
AERONAUTICAL AND
GENERAL ENGINEERS

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCED S, WEYBRIDGE."

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

THE L.V.G. BIPLANE: TYPE C.V.



Front View of the L.V.G. biplane: type C.V

"L'Aérophile" for April, 1918 contains an interesting description of the L.V.G. biplane, type C.V., a translation of the substance of which is reproduced, with certain illustrations, under a sense of obligation to the editor of that excellent French technical paper.

Comparative specifications of the L.V.G. biplanes C.II., C.IV., C.V., and Rumpler C.IV.:—

	L.V.G.			Rumpler
	C.II.	C.IV.	C.V.	C.IV.
an (upper wing)..	12.85m.	13.60m.	13.62m.	12.60m.
, (lower ,,)..	11.35m.	12m.	12.85m.	12.10m.
tal length	8.10m.	8.60m.	8.10m.	8.4m.
ight	3m.	3.10m.	3.20m.	3.25m.
ting surface ..	37.60sqm.	40sqm.	42.70sqm.	33.50sqm.
eight	845kg.	900kg.	920kg.	1010kg.
wer of motor ..	175h.p.	235h.p.	225h.p.	260h.p. 250h.p.
ake ,, ,, ..	Mercédès	Mercédès	Benz	Mercédès or Maybach

Note.—1 metre=32.37 inches
1 sq. metre=10.75 sq. feet.
1 kilogramme=2.2 lbs.

The L.V.G. type C.V., which is constructed by the Luft Verkehrs Gesellschaft (Aeronautical Transport Company), is a 2 seater. It belongs to the "general purpose" class, sometimes known as the Army Corps type.

Less speedy on the flat than the Rumpler C.IV., described in The Aeroplane of February 27th, 1918, its rate of climb is inferior (4,000 metres in 35 minutes), and equally its ceiling is less elevated (a little more than 5,000 metres).

Its speeds are as follows:—

At 2,000 metres ... ... 164 km. per hr.
At 3,000 metres ... ... 160 km. per hr.
At 4,000 metres ... ... 150 km. per hr.

The Wings.

The upper and lower wings are set at a dihedral angle, more so the lower ones.

This dihedral is of 1° to the upper wings and of 2° to the lower. They are neither staggered nor swept back.

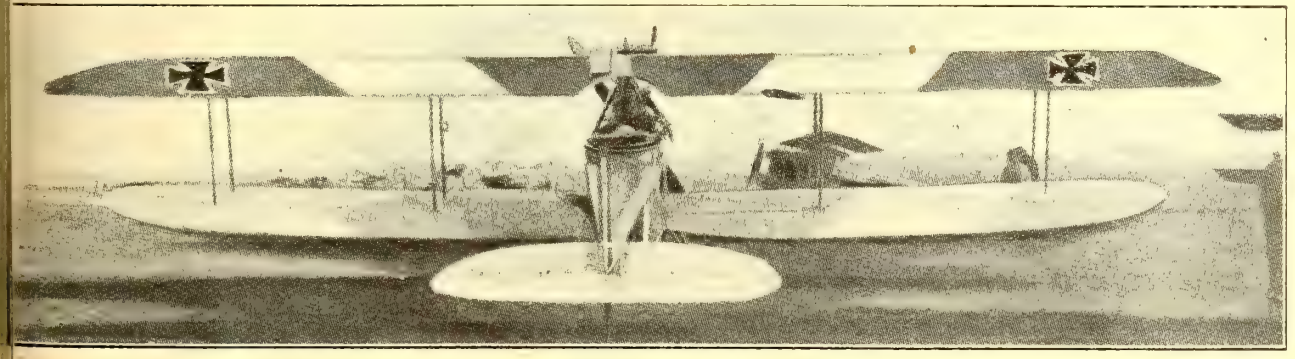
The trailing edges of the wings are flexible. The ribs are spaced about .4m. apart, with false intermediary ribs. The incidence of the wings is as follows:—

At 1st and 2nd ribs ... ... 4.5°
At 3rd to 9th ribs ... ... 5°
At 10th rib ... ... 4.75°
At 11th rib ... ... 4.5°
At 12th rib ... ... 4°
At 13th rib ... ... 3°

The upper wings, viewed in plan, are slightly trapezoidal, with rounded edges.

Their chord is 1.74m., and in the centre a semi-circular piece is cut out of the trailing edge above the pilot's head.

The ailerons project past the ends of the wings by .34m. Their form is rounded, and resembles that of the ailerons of the Gotha.



Rear View of the L.V.G. biplane: type C.V.

Their total length is 2.61m. Their chord varies from .53m. inside to .75m. at the projecting portion.

The hinges of the ailerons are parallel with the leading edge of the wing. They are attached by means of pins or bolts threaded through hinge loops, held in place by keys, on the system employed to attach the ailerons on the Roland fighter D.II. The arrangement has the advantage of permitting the quick attachment of the members.

The lower wings, following the present tendency of German aeroplanes, are rounded at the ends, and taper at the rear, as in the D.F.W., Rumpler C. IV., and Albatros C. IV. Their maximum chord is 1.59m.

The aileron cables pass through the interior of the lower wings.

The interplane struts (two pairs on either side of the fuselage) are constructed of streamline timber .105m. in diameter, and tapered towards both ends. By reason of the differing dihe angles the inside and outside struts are not the same length.

The outer struts are 1.635m. long and the inner ones 1.59

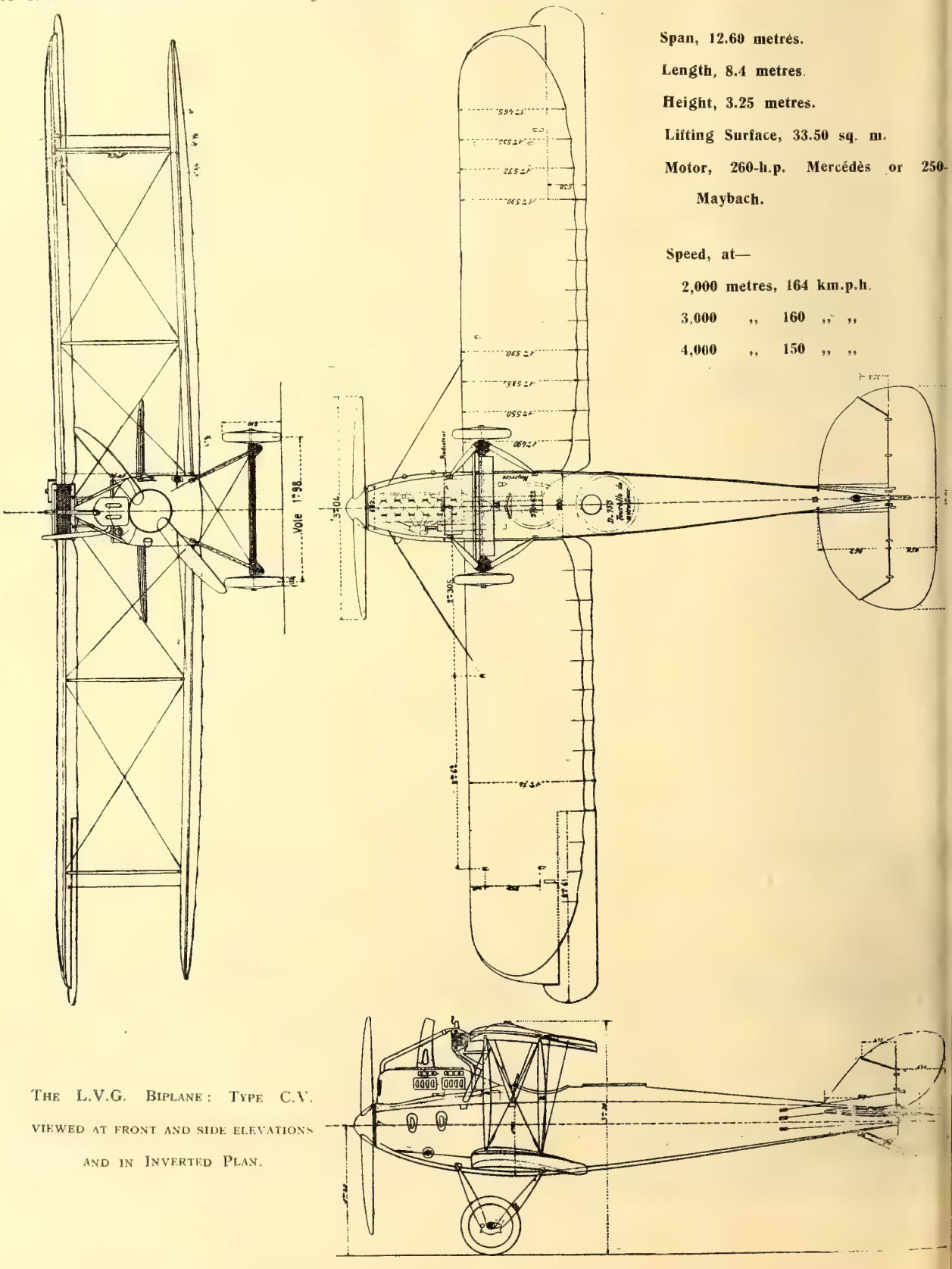
The gap between the wings is 1.74m. at the fuselage and 1.6 in line with the external struts.

The total lifting surface is 42.9 sq. m., that of the upper pl being 23.73 sq. m., and the lower 19.17 sq. m.

The cabane struts are in the form of an "N," inclined wards the rear, and converging to the fixed centre sectio the upper plane, the width of which is .12m

The Tail.

The shape of the stabilising plane, or fixed tail plane, resem that of the Albatros fighter. At the same time, it should noted that its leading edge is flatter, and it is therefore no deep.



Span, 12.60 metres.

Length, 8.4 metres.

Height, 3.25 metres.

Lifting Surface, 33.50 sq. m.

Motor, 260-h.p. Mercédès or 250-

Maybach.

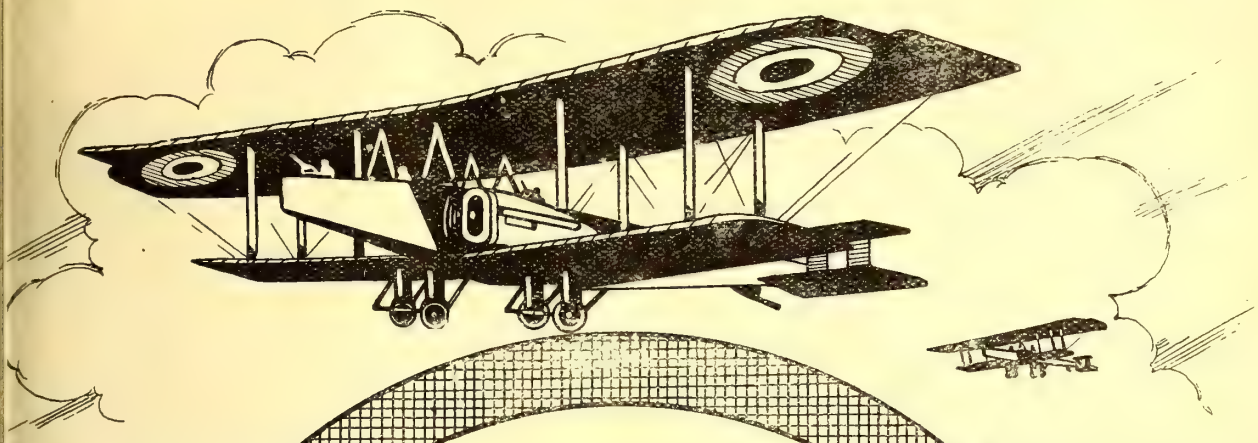
Speed, at—

2,000 metres, 164 km.p.h.

3,000 ,, 160 ,, ,,

4,000 ,, 150 ,, ,,

The L.V.G. Biplane: Type C.V. viewed at front and side elevations and in Inverted Plan.



"I am returning herewith a pair of 'Triplex' Goggles, and shall be glad if you will kindly replace same for me .. I had a bad smash in a Nieuport Scout and **only for your goggles, should most certainly have lost an eye.**"

"You will be pleased to hear that **'Triplex' saved my eyes** from being badly cut, and will also be interested to learn that the **'Triplex' windscreen was unbroken,** though the immediate surroundings were battered."

100% Safety & Visibility

are the outstanding features of 'Triplex' Unsplinterable Safety Glass.

It has the unqualified approval of leading Aeronautical Engineers for Windshields, Observation Panels, Instrument and Map Covers, Goggles, etc.

Catalogue Mailed on Request.

The 'TRIPLEX' SAFETY GLASS CO., LTD.,
(Reginald Delpech, Managing Director),
1, ALBEMARLE ST., PICCADILLY, LONDON, W.1.

Telephone—Regent 1340.
Telegrams—"Shatterlys, Piccy, London."

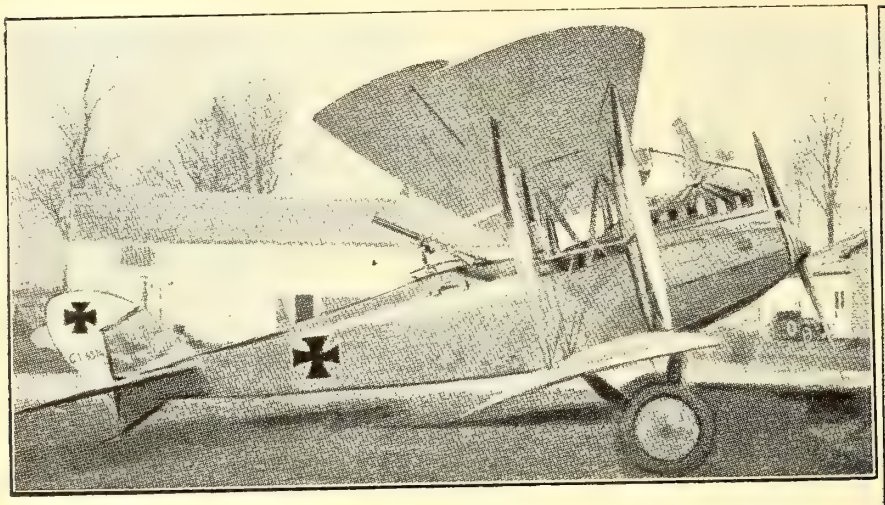
CONTRACTORS TO H.M. GOVERNMENT

"I am sending you to-day, under separate cover, a pair of **'Triplex' Goggles** which came to grief the day before yesterday. A small piece of shrapnel hit them. It is a good thing the Goggles happened to be **'Triplex'** or else it would have been a case of Nelson and one eye."

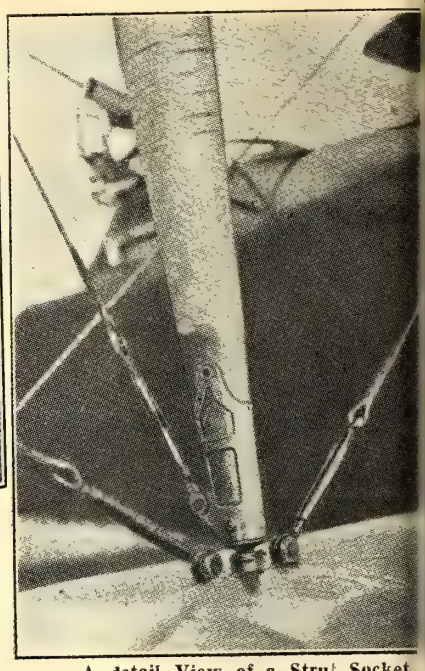
"There is no doubt **'Triplex' saved both my eyes,** as they would have been done for with any ordinary glass"

W.

'Triplex' Safety Glass



A Side View of the L.V.G.: type C.V.



A detail View of a Strut Socket.

The tail plane consists of two separate parts attached one on each side to a fixed section embodied in the fuselage, which like it is constructed of three-ply.

The elevator is a single flap, with rounded corners and balanced by a triangular extension at each end. The greatest width is 3.04m. and the depth .65m. The small triangles have a base of .39m. and are .39m. high.

At the outer angle of each of the tail planes one finds a projection of about .020m., intended to eliminate vibration from the tips of the balanced ends of the elevators by screening them from the air blast.

The balanced rudder is placed above the elevator, and forms with the fixed fin an oval inclined backwards.

The fixed fin is constructed of three-ply, and is trapezoidal in shape. The total height of the vertical empennage is 1.068m.; its depth is .675m. (1.15m. including the compensated portion). One finds on the fixed fin a projection in front of the compensating point of the rudder similar to those found on the fixed tail planes.

The internal structure of these members consists of steel tubework.

The control cables pass through the fuselage, coming outside 1.50m. from its extremity; one pair of the elevator cables pass through a channel in the thickness of the stabilising plane.

The fuselage is entirely built of varnished three-ply, and is rectangular in form, with a well-rounded top, the underside being slightly less rounded. The sides have a slight outward bulge, accentuated at the level of the pilot's seat.

The general lines are not so slender as those of the Rumpler C.IV.

The Power Plant.

The L.V.G., C.V., is driven by a Garuda airscrew, type V., with a diameter of 3.04m. The boss of the airscrew is enclosed in a "Casserole," or pot, .58m. diameter.

The motor is a 225 h.p. Benz, also used in the D.F.W. and F.D.H.G. II.

It is fed by two tanks, with a capacity of 249 litres. On the upper left wing is fitted a feed tank. The contents of these tanks permit of a flight of about 3¼ hours.

The upper portion of the motor is entirely covered in with a panelled and removable sheet steel bonnet.

The exhaust is led overhead as in the Rumpler C. IV. Contrary to that machine it is not much curved, but rises nearly vertically. [The drawings and photographs show a slight curve.—Ed. The Aeroplane.]

The honeycomb radiator, the capacity of which is 35 litres, is placed in front the wings. It is rectangular in shape, and is attached to cabane struts by two brackets. Its upper part is attached to fixed centre section of the upper plane by a small steel tube fo

The temperature regulating blind placed in front of the rad tor is one of the best in use. It is simpler and more ratio than the system of shutters. It consists of a movable blind strong fabric, which is rolled and unrolled at the will of pilot, which permits the stoppage of the passage of air and regulation of the cooling. [One commends the idea to the sup elaborators of the R.A.F. Technical Department.—Ed.]

Accommodation.

The accommodation for the pilot is of oval form, the big dimension being in the direction of travel.

Very close to this is arranged the passenger's seat inside turntable .86m. in diameter, which carries a "Parabellum machine gun.

In front and on the right side is a Spandau machine gun fir through the airscrew, and controlled by a Bowden wire.

Wireless apparatus is installed.

The landing carriage consists of two pairs of streamline " struts built of timber, and a pair of wheels 810mm. x 125 mm

The tyres are marked "Harburg," Vienna. The wheel tr is 1.98m. The axle is placed in a streamline wooden fairing

The suspension consists of "Sandow" elastic cord.

As in the Rumpler C. IV., a drag cable runs from the fr of the fuselage to the base of the inner interplane strut.

The tail skid, which is attached to a small fin underneath fuselage, is constructed of wood, and is terminated by four s laminations .002m. thick.

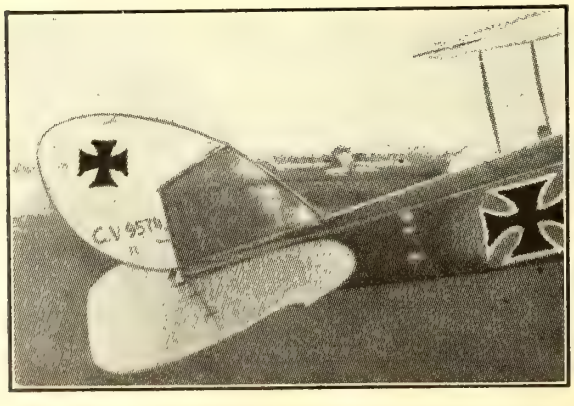
The skid is sprung with elastic cord.

The machine is camouflaged in bright green and mauve the upper sides of the wings and on the horizontal empennag

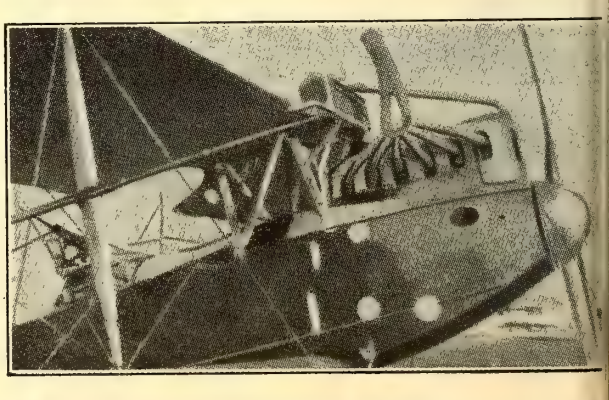
The under sides of these surfaces are bright blue.

In the passenger's cockpit a hole in the floor permits passage of a camera.

The machine described above was apparently intended photographic reconnaissance. It carried no bomb-dropping g



A View of the Tail Members.



The Nose of the L.V.G.: C.V.

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren Picoy, London."
" Phone—280 Gerrard

Also at

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—VIII.

BY C. SYLVESTER.
Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

FLUIDS AND GASES OF INTERNAL COMBUSTION ENGINES.

Petrol.

Petrol is produced by distilling crude petroleum, and its component parts are carbon and hydrogen. Petrol, unlike the fluids used in oil engines, does not require heat to vaporise it.

The specific gravity of good quality petrol should never exceed 0.725.

Petrol does not corrode nor have any deteriorating effect upon metals. It will, however, melt paraffin wax, bitumen and such-like substances.

The calorific value of petrol is about 20,000 British Thermal Units. To make this quite clear it may be said that the calorific value of any fuel is the amount of heat, expressed in British Thermal Units, which will be given out by one pound of fuel.

The calorific value of any fuel may be determined by means of a calorimeter.

Paraffin.

Paraffin is chiefly used as the working fluid for oil engines. It is obtained from the distillation of crude petroleum, or at least, during the process of distillation. Its component parts are carbon and hydrogen in almost the same proportions as petrol.

The flash point of paraffin is much higher than that of petrol, and, if used alone, it is necessary that it should be vaporised by some means before it may be converted into gas.

The specific gravity of paraffin is 0.80 and the calorific value is about 18,000 B.Th.U. per lb.

Paraffin is much cheaper than petrol, and it is fairly successful when used in engines of quite a large size. Its chief drawback is, however, its tendency to deposit carbon. After an engine has been running for a short time, the spray box and the inlet and exhaust valves are choked up with carbon.

The fuel used in Diesel engines is very crude oil, and it must have a high hydrogen content, a high calorific value, and a low viscosity—the latter to guarantee a good flow through the fuel pipes in cold weather.

Fuel oils which may be recommended for use in Diesels are mineral oils which have been freed from benzine. Oils of this description would contain at least twelve per cent. of carbon, and the calorific value would be about 18,000 B.Th.U. per lb.

Benzol.

Benzol is obtained by a distillation of coal tar. It contains more carbon and less hydrogen than petrol.

The flash point of benzol is much less than that of petrol, it should therefore be handled with greater care.

For use with internal combustion engines it has its advantages and disadvantages. It is easily compressed to 100 lbs. per square inch without preigniting, but it is much more likely to deposit carbon than petrol. It often contains foreign impurities which attack some metals.

In price, it is a trifle dearer than petrol at the present time. It may be more easily procurable, but it is not particularly suitable for use in aero engines.

One reason for this is that it attacks rubber—a very serious drawback.

The specific gravity of benzol is 0.87, and its calorific value is somewhere in the region of 19,000 B.Th.U. per lb.

HEAT, WORK, AND H.P. UNITS.

In the second article of this series the definition of a British Thermal Unit was given. It is now necessary to show how the British Thermal Unit is related to other units which are used to calculate the amount of work done in an engine.

To explain this clearly it is not necessary to go into the intricate details of the many units which are related to each other. Just sufficient to show how they are related will meet the case.

1. One horse-power is equal to 33,000 foot-lbs. per minute.
2. One Joule is equal to .7373 foot-lbs. per sec.
3. One British Thermal Unit is equal to 1058 Joules.
4. The number of "gram calories" is equal to the number of B.Th.U. × 251.
5. Kilogram calories per kilogram × 1.8, is equal to British Thermal Units per lb.
6. The direct relation between the British Thermal Unit and the foot-lb. is obtained from the formula:—

British Thermal Units × 778 is equal to the number of foot-lbs.

Referring to the last numbered item we will suppose that the number of B.Th.U. is equal to B, and the number of foot-lbs. C, then if 778 is represented by A:—

$$B \times A = C, \text{ and}$$

$$\frac{C}{A} = B, \text{ therefore}$$

$$\frac{C}{B} = A.$$

The approximate H P of an engine may be roughly calculated by the following:—

$$H\,P = \frac{D^2 \times N}{2.5} \times 3.$$

that is, where D is the bore of the engine and N is the number of cylinders.

For instance, a six-cylinder engine has a bore of six inches then

$$\frac{6 \times 6 \times 6}{2.5} = \frac{216}{2.5} = 86.4 \therefore 86.4 \times 3 = 259.2 \text{ H.P.}$$

This rule stands good for engines where the speed does not exceed 1,400 r.p.m. and the explosion pressure is not more than 390 lbs. per square inch.

IGNITION.

Ignition in an aero engine is carried out by means of a spark across the points of a plug. This spark is produced by a magneto or induction coil.

Sparking Plugs.

The sparking plug is one of the most vital parts of an aero engine.

So much so that if there is the slightest loss of compression through the plug blowing, the power of the engine is considerably affected.

Loss of compression does not only mean loss of power, but the leakage of gas through the plug, however slight, makes the plug overheat, and so cause self-ignition.

Further, if the plug is not absolutely gas-tight, any unburnt gas is deposited upon the insulation of the plug in the form of carbon or soot. This soot is a conductor of electricity, and allows part of the current to leak away, instead of the whole spark being concentrated across the points of the plug.

From this it will be seen that the insulator must be designed and constructed so that the joint between it and the metal body of the plug is perfectly gas-tight, and yet the insulator must not crack when heated up owing to the different expansion of the insulating material and the metal.

The usual plan in ordinary plugs is to form a shoulder on the insulator. A copper and asbestos washer is put on either side of this shoulder, which is then held down to the metal body by means of a screw gland. This joint allows for the difference in expansion, but it cannot really be considered absolutely gas-tight. After the plug has been heated and cooled several times, the copper-asbestos washers lose their springiness and there is always more or less a leakage of gas past the joint.

Aero Plugs

A plug of this description would be practically useless for aero engine work. There are, however, several methods adopted by plug manufacturers to overcome this trouble which are more or less satisfactory.

One method, which appears to meet the case, is to machine a small shoulder on the centre pin at the point where it enters the open portion of the plug. This shoulder is insulated with mica so that when the mica washers are placed on the pin terminal screw and tightened up, the insulated shoulder presses against the plug material and makes a good joint.

Plug Pins.

It is not essential that sparking plug pins should be made as thin as possible. When small pins are used, the heat absorbed by the pin can only be conducted away very slowly owing to the small area of the point. Plug pins should be made as large as possible in order that the heat may be more rapidly carried away.

Shape and Material of Sparking Points.

The sparking points of plugs should be made of pure nickel. This material is proved to be the best for this purpose.

As far as the shape of the sparking points is concerned, it may be said that this is a continual problem for designers.

Mica Aero Engine Plugs.

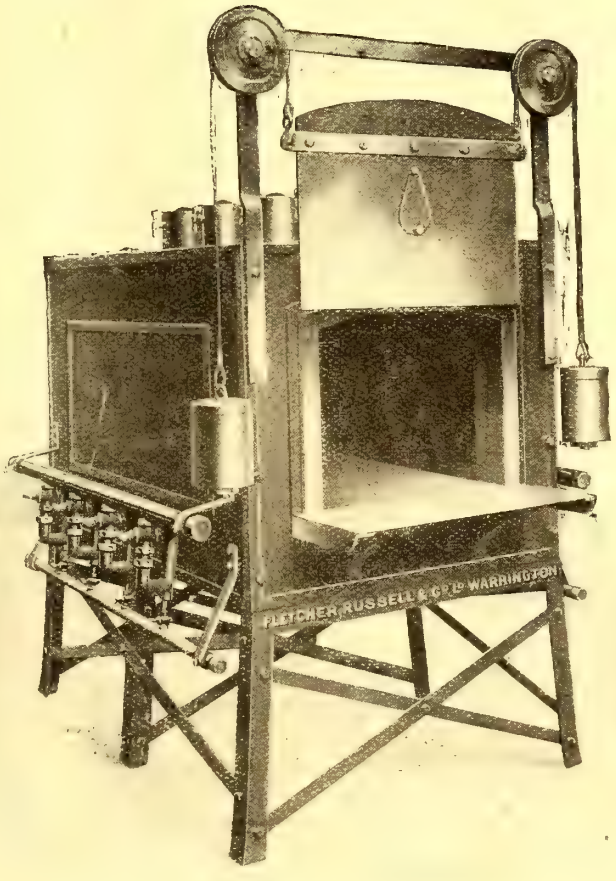
Generally speaking, the advantage of a plug with mica insulation is that it is unaffected by heat, and so will stand up to very severe conditions. The disadvantage of mica is that if it is exposed to soot or excessive lubricating oil it will require more cleaning than a plug with Steatite insulation.

Gas Heated Oven Furnace

FOR USE WITH GAS AND
— AIR UNDER PRESSURE. —

For Hardening Annealing, Case Hardening &c.

Any size or pattern made to order.



N 4928.

This class of Furnace is largely used for purposes of Hardening "HIGH SPEED STEEL" TOOLS, &c.

Also where a High Temperature or quick Heating is desired.

FLETCHER, RUSSELL & Co., Ltd.,

:: CENTRAL ROAD, ::

WARRINGTON.

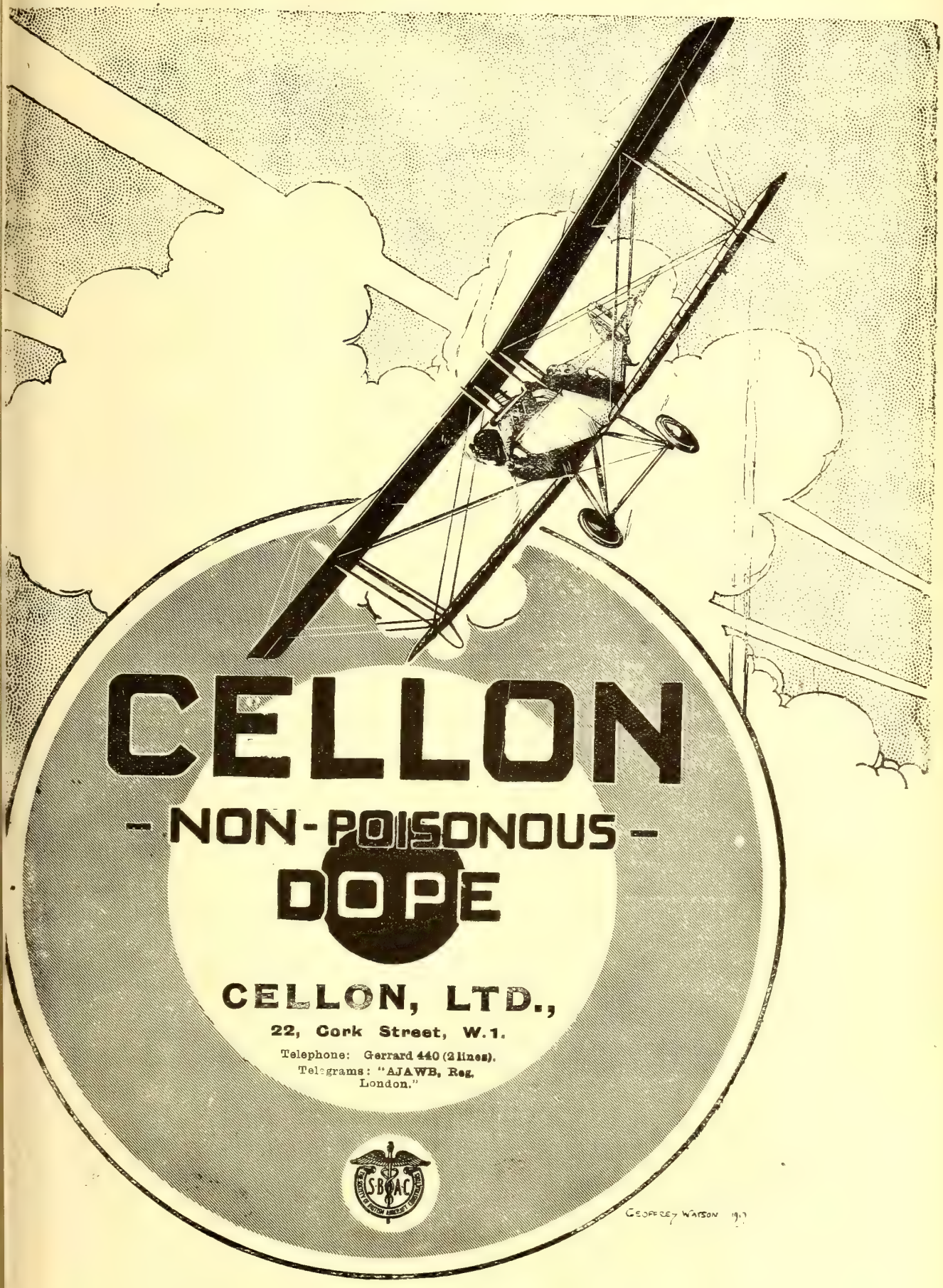
AIRCRAFT MANUFACTURING COMPANY——LIMITED

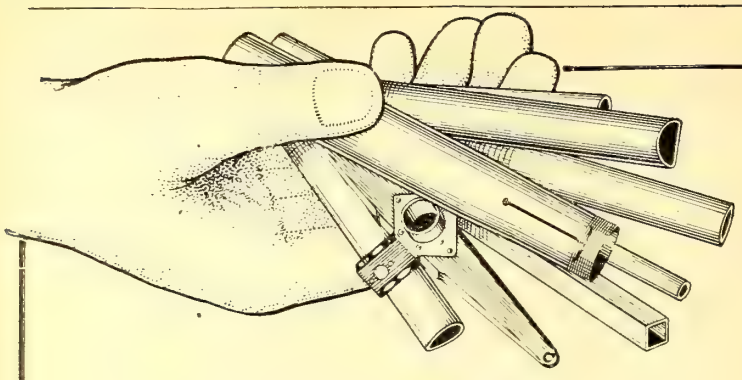
Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

And at
HENDON, N.W.9.


CELLON
-NON-POISONOUS-
DOPE
CELLON, LTD.,
22, Cork Street, W.1.
Telephone: Gerrard 440 (2 lines).
Telegrams: "AJAWB, Reg. London."
SBAC
GEOFFREY WATSON



The raw material is in hand!

WE KNOW AIRCRAFT NECESSITIES and can supply complete tubular components, such as elevators, fins, rudders, axles, skid stays, etc. We can also manipulate steel tubing by bending, brazing, trapping, screwing, slotting, cranking, necking, etc.

YOU OUGHT TO KNOW US—AND OUR PRODUCTS.

Steel Tubing is raw material to every aircraft manufacturer; we make it—the best in each class.

Send us your enquiries.

Telegrams—"Accles, Oldbury."

ACCLES & POLLOCK LIMITED

Telephone—Oldbury 111 (4 lines.)

OLDBURY, BIRMINGHAM.

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co Ltd

CONTRACTORS TO H.M. GOVERNMENT.

Designers and Manufacturers of all Types of Aircraft for Overland and Oversea Purposes, Flying Boats, etc.

Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

229-231, Hammersmith Road, W.

SBAC — The Society of British Aircraft Constructors Limited

HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

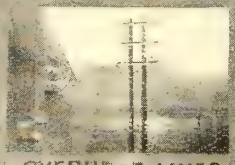
CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON





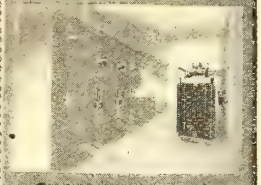
CABLES.



OVERHEAD LINES.



MOTORS and GENERATORS.



SWITCHGEAR and TRANSFORMERS.

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E.7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 205 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159 W. George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

SAMUEL MERCER & CO.,

Telegrams RECONCILED CANNON, LONDON

Proprietor—S. J. MERCER.

Telephone: CITY 6342.

Metals for Aircraft.



MILD STEEL SHEETS
SPECN. S3 & 9A.
Passed & Stamped A.I.D.

BEST CHARCOAL TINNED & LEAD COATED.

BLACK C/R and C/A SHEETS.

GALVD. SHEETS.

BRASS AND COPPER SHEETS.

SOLDER. INGOT TIN.

WELDING WIRE.

COPPER BITS, ETC.

LARGE STOCKS IN OUR OWN WAREHOUSE.

Immediate Deliveries.

Manufacturers of Solder *for all purposes.*

198, UPPER THAMES ST., LONDON, E.C.4.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

LANGTON ROAD, CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278. (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.
Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500
Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines)
Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.
British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol" Bristol 3011
British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551
Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.
Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1902 (3 lines)
Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).
Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176
Grahame White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London. Kingsbury 120
Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420
Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London" Regent 612.
Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)
Martinsyde Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171
National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.
"Nieuport" & General Aircraft Co., Cricklewood, London N.W.2. "Nieuscout, Crickle, London" Willesden 2455.
Norman Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.
The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London" Putney 2240-2241
Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester" City 8530 8531, Manchester
Saunders, S. E., Ltd., East Cowes, I.O.W "Consuta, East Cowes" Cowes 193
Short Bros. Rochester, Eastchurch and Whitehall House, S.W "Tested, Phone, London" Regent 378
Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston" Kingston 1688 (8 lines).
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.
W. G. Tarrant, Byfleet, Surrey. Byfleet 1, 2 & 3. Tarrant, Byfleet.
Thames Aviation Works, 141, Curtain Rd., E.C.2
Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfoto, Knights London. Kensington 680
Waring & Gillow, Ltd. Hammersmith. "Warisen, Ox, London" Museum 5000.
Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120
White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes" Cowes 5
Whitehead Aircraft (1917), Ltd., Richmond Surrey "Whitecraft, Richmond Surrey" Richmond 1780-1
Wycombe Aircraft Constructors, Ltd., High Wycombe Bucks "Aircraft, High Wycombe." High Wycombe 84.

Airships—

Airships, Ltd., High Street, Merton Wimbledon 1314
Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London." Regent 378.

Aluminium Castings (Sand and Die)

Crow, R. W., 216, Goswell Road, London, E.C.1 "Kindasses, Isling, London" City 846

Bent Timber Parts

Hoptons, Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London" Museum 406
Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.
Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines). "Edibrac, 'Phone, London."

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings— Avenue 995, 996, and 7006.

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.
Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1313
Rubery, Owen & Co., Darlaston, South Staffs.
The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wratdless, Phone London." City 2681-2

Cable Coverings and Cable Controls—

The Bowden Brake Co., Ltd., Tyseley, Birmingham. Acock's Green 103 & 104 Bowden, Acock's Green.
Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4670

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C "Greenberg, London" Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1 Regent 2165
Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London" North 3405-6.

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury" Oldbury 241 (2 lines)
Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.
P.D.V. Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond." Richmond 1681
Thompson Bros (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, L., & Co., 30, Newgate Street, E.C.1 And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312
British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046.
The British Emaiite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280
Cellon, Ltd., 22, Cork Street London, W.1. "Ajawb, Reg. London." Gerrard 440.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.
Arrol-Johnston, Ltd., Dumfries "Mocar, Dumfries." Dumfries 281-282
The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.
Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London" Vic 7020.
Gordon Watney & Co., Ltd., Weybridge "Mercedes, Weybridge" Weybridge 550 (7 lines).
Green Engine Co., Ltd., Twickenham. Richmond 1205
Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith" Hammersmith 1910.
Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London" Gerrard 8926.
Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rollhead, London." Gerrard 1654 5-6.
Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton." Wolverhampton 085.
The Gnôme & Le Rhône Engine Co., L. 47, Victoria Street, S.W. "Eleven London" Walthamstow 408 (2 lin

Electrical Accessories—

Belling & Co., Montague Road, Upper monton, N.18. "Belling, Edmonto Tottenham 19
Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 15
Mann, Egerton & Co., Ltd., 177, Clevela Street, London, W.1. "Installing, E road, London." Museum
Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. "F renheit, Birmingham." Midland 0
The Rotax Motor Accessories Co., Ltd., V toria Road, Willesden Junction, N.W. "Rodynalite, Phone, London." Willesden 24

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Cov try." Coventry 2
Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 15

Electric Lighting and Power

E. Stanley Fardon, A.M.I.E.E., 67, Mos Street, Manchester
Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 15
Mann, Egerton & Co., Ltd., 117, Clevela Street, London, W. Museum 70 (4 line Installing Euston Road.

Electro Platers and Met Polishers' Engineers—

W. Canning & Co., 133-137, Great Hamp Street, Birmingham. "Materials, B mingham. Birmingham 3622 Central (3 line

Enamel—

Silico Enamel Co., New Cross, London, S

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, L don, S.W.1. "Edibrac, 'Phone, Londo

Flexible Shafts—3540 Victoria (3 line

Herbert Terry & Sons, Ltd., Reddit "Springs, Redditch." Redditch

Fluxes—

Imperial Light, Ltd., 123, Victoria St., We minster, London, S.W.1. Victoria 3 (3 lines). "Edibrac, 'Phone, London."

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot V lage, Bournemouth. "Etches, Winton." Bournemouth 11
Cambridge School of Flying and Aerodrome C 308, St. Andrews St., Cambridge. "C bon, Cambridge." Cambridge 5 and 10

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavem House, London, E.C.2.

Galvanising— London Wall 573 and 61

Boulton & Paul, Ltd., Rose Lane, Norwic "Aviation, Norwich." Norwich 8

Gauges—

J. A. Prestwich & Co., Northumberland Par Tottenham, N.17.

Gears—

Moss Gear Co., Ltd., Thomas Street, Aston Birmingham "Mosgear, Birmingham." East 4

Glue—

Cannon, B., & Co., Ltd., Lincoln. Lond Office, 110, Cannon Street, E.C "Bececolin, Cannon, London." City 12
Improved Liquid Glues Co., Ltd., Gt. Hert tage Street, E. (Croid.). "Exeroide Wapp, London." Avenue 317
Mendine Co., 8, Arthur Street, E.C. Bank 587
Oldroyd, Wm., & Sons, Ltd., 9, Mincing Lan E.C.

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemar Street, Piccadilly, W.1 "Shatterlys, Picc London" Regent 134

Hack Saw Blades & Machines—

Victor Saw Works, Ltd., 2 and 3, We Street, Finsbury Circus, London, E. Vicsaw, Phone, London." London Wall 18

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 6 Southwark Street, London, S.E.1. "Kinne London" Hop 372 (2 line
Sturtevant Engineering Co., Ltd., 147, Que Victoria Street, London, E.C.4. "Stu tevant, London." Central 7121 (6 line

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Co mercial Wharf, Lambeth, S.E. "Gabrie son, Watloo, London." Hop 71
Robert Young's Construction Co., Ltd., Cano bury Street, Essex Road, London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery Lan W.C.2. Holborn 12

Buyers' Guide.



ıments (Scientific, Alti-ters, etc.)—

Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 642

& Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, ndon" Walthamstow 180

er Cloth—

Pegamoid Ltd, 134, Queen Victoria St, ndon, City 9704 (2 lines). Pegamoid, nt, London.

eto Driving Pieces—

t Terry & Sons, Ltd., Redditch prings, Redditch." Redditch 61

etos—

LL Magneto Syndicate, Ltd., Coventry. Corlton, Coventry." Coventry 1008-1009.

ritish Lighting & Ignition Co., Ltd., Tottenham Court Road, W.1. "Vicks g. Phone London" Museum 43

ritish Thomson-Houston Co., Ltd., Lower rd Street, Coventry. "Asteroidal, Coven-" Coventry 278.

Manufacturers—

, Chas., & Sons, Ltd., Birmingham Lifford, Birmingham." Central 42-43

in General— Avenue 1432

J. B., & Son, 30, St. Mary Axe, E.C.3

& Co., 46, Fenchurch Street, London, .3. "Poetry, Fen, London." Avenue 995, 996, and 7000

Mercer & Co., 198, Upper Thames eet, E.C.4. "Reconciled, Cannon, ndon" City 6342.

Parts and Fittings—

& Pollock, Ltd., Oldbury, Birmingham cles, Oldbury." Oldbury 111 (3 lines)

ine General Sundries, Ltd., Fulwood use, Fulwood Place, High Holborn, C. "Zeppiskout, Holborn, London." Holborn 4959.

Supplies Co., Ltd., Ascot House, 125, g Acre, W.C.2 Upcast, Rand, ndon" Gerrard 276 (2 lines)

& Harrison, Ltd., Hythe Road, Willes-Junction Willesden 2267

Jones & Bayliss, Ltd., Wolverhampton. lts and Nuts.) "Bayliss, Wolverhamp-" Wolverhampton 1041.

rn Aeroplane & Motor Co., Ltd., mpia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines

Metal (Kingston), Ltd., Kingston-on mes

J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432

d Rim and Tube Co., Lombard Street, rmingham. Lombardic, Birmingham." Midland 211 (2 lines).

Egerton & Co., Ltd., 177, Cleveland et, London, W.1. "Installing, Eus-, London" Museum 70

ord, Fredk., Lt., Lifford, Birmingham. remo, Birmingham." King's Norton 261.

on, J. H., & Co., 1, Albemarle Street, don, W.1 Regent 3906.

Owen, & Co., Darlaston South Staffs.

Joseph, & Sons, Ltd., Wellington opshire. "Sankey, Wellington, Salop." Wellington 66

ilvo Engineering Co., Ltd., 10 to 16, re Street, High Holborn, London, W.C.1.

ilvipult, Phone, London." Holborn 410

lston Aero & Engineering Co., Ltd., Albemarle Street, Piccadilly, W.1. elaero, Phone, London." Regent 1181.

rtax Motor Accessories Co., Ltd., Vic-a Road, Willesden Junction, N.W.10. odynalite, Phone, London." Willesden 2480.

on Bros., Ltd., Bradley, Bilston. ompson Bros., Bilston." Bilston 10.

Engineering Co., Ltd., Old Oak Com-Lane, Willesden Junction, N.W.10.

Shearing Tools—

mery, Smith & Co., Ltd., Keynsham, r Bristol. "Ingenuity, Saltford." Keynsham 21.

Spinnings—

& Sons, Lawrence Road, Tottenham, 5.

Bolts—

re Bros., Hildreth Street, Balham, Battersea 415.

Owen & Co. Darlaston, South Staffs

laneous—

n, D., & Son, Ltd. (Roofs), Belf. nderson, Belfast." Belfast 4033-4034-4035.

Wire, Ltd., Willesden Junction, owirelim, Harles, London." Willesden 2400 (3 lines)

Metal (Kingston), Ltd., Kingston-on-mes.

Bros., Ltd., Great Eastern Street, .1. "Imbrowned, Bethroad, London" London Wall 6300.

Herbert Flood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115

Motor Cars—

Arrol Johnston, Ltd, Dumfries "Mocar, Dumfries" Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Euston Road, London." Museum 70

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lines)

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on Thames

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing"

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterless, Picey, London." Regent 7340

Parachutes— London.

E. R. Caltbrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 725

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 22, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdom."

Presswork— London. Hop 4340.

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9 Kingsbury 104

Lang Propeller, Ltd., Weybridge. "Aerosticks Weybridge" Weybridge 520-521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich" Norwich 482 (4 lines)

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." 24214 Leeds

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347

Westland Aircraft Works, Yeovil "Aircraft, Yeovil." Yeovil 120

Pyrometers— Yeovil.

The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth Letchworth 26

Radiators—

Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Gairadico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co. Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 460

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 48

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton." Southampton 1337.

Seats for Aeroplanes—

Bowser, E., 50, Park Lane, Leeds. Leeds 21953.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2840

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk, Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham

Rubery Owen & Co., Darlaston, South Staffs S.W. "Flamma, Vic, London." Vic 4830.

Sheet Metal Work—

The Acetylene Corporation of Great Britain, Ltd., 40, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Rubery Owen & Co., Darlaston, South Staffs.

The Selsdon Aero & Engineering Co. Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines) "Edibrac, 'Phone, London."

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758

Springs— don."

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings— Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield" Sheffield 3230 to 3237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Tanks & Cowls for Aeroplanes

Zephyr Ventilating Co., Ltd., Ty. piatt Road, Bristol. Telegrams—Zephyr, Bristol.

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Timber—

Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 15

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquire, London." Museum 466.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 1992, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page



The · Aeroplane

Acceptance and Experimental Flights –

The Prodger Aviation Co "Aeromnia, Ph, London" Gerrard 2782-3 lines

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., 49a, Victoria Street, Westminster, S.W.1 "Calmanac, Vic, London" Victoria 4830

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edlbrac, 'Phone, London"

Brass Sheets for Tipping Propellers—

Pratt & Co., 40, Frenchurch Street, London, E.C.3 "Portex, Fen, London"

Buildings –

Avenue 693, 699 and 7000

Boulton & Paul, Ltd., Rose Lane, Norwich. "Viaduct, Norwich" Norwich 851

Palmer, T. W. & Co., Church Road, Merton Abbey, S.W.1 Wimbledon 1315

Rubery, Owen & Co., Darlaston, South Staffs

The Wildey Co., Ltd., Salisbury House, London Wall, E.C.2 "Wildiness, Phone, London" City 2681-2

Cable Coverings and Cable Controls –

The Bowden Brake Co., Ltd., Tyseley, Birmingham. Acock's Green 103 & 104 Bowden, Acock's Green

Herbert Terry & Sons, Ltd., Redditch Springs, Redditch" Redditch 91

Carburettors –

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070

Casein—

Newtonhof, Surrey & Co., Ltd., 5, Lloyds Avenue, London, E.C.3 "Surrendum, Fen, London" Avenue 34 and 35

Celluloid (Non-Flam.)—

Grenfell & Sons, 8 Water Lane, E.C. "Greenfell, London." Central 1906

Clothing—

Burberrys, Ltd., Haymarket, S.W. Regent 2165

Dunn & Co., Ltd., Euston Road, N.W.1 "Dunnetic, London" Museum 3405 6

Mole, Lewis & Co., Ltd., Norwich "Mole, Norwich" Norwich 482 (4 lines)

Mulberry, Brooklands, Byfleet "Mulberry, Weybridge" Weybridge 345 Byfleet 127

Nelson Aircraft Manufacturing Co., Ltd., 17, Dartmouth Street, Westminster, Easton "Nelsonair, Vic, London" Victoria 3373

Norman & Grand Aircraft Co., Cricklewood, London, N.W.2 "Normagrand, Cricklewood, London" Willesden 2455

Norman Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 48

The Regent Carriage Co., Ltd., 126-132, New King's Road, Fulham, S.W. "Regentcar, London" Putney 2249-2241

Roe, A. V., & Co., Ltd., Manchester "Tripoli, Manchester" City 8531-8531, Manchester

Saunders, S. L., Ltd., Cox Cowes, I.O.W. "Camise, East Cowes" Cowes 109

Short Bros., Rochester; Pochurch and Wardrobe House, S.W. "Tested, Phone, London" Gerrard 2328 or 378

Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 1088 & lines)

Standard Aircraft Manufacturing Co., 35, Bow Common Lane, E. East 2023

W. G. Tarrant, Byfleet, Surrey Byfleet 2 & 3

Tarrant, Byfleet Tarrant, Byfleet

Thames Aviation Works, 141, Curtain Rd., E.C.2 Vic. 1, Imperial Court, Byfleet Street, Knightsbridge, S.W.1 "Vickerfel Knights, London" Kensington 1850

Young & Gillow, Ltd., Hammersmith "Watson Ox, London" Museum 5000

Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 126

White & Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 10

Whitehead Aircraft (1917), Ltd., Rye Road, Surbiton "White, Richmond, Surrey" Richmond 1788-1

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84

Airships—

Wolseley 1314

Airships, Ltd., High Street, Merton

Short Bros., Rochester, Eastchurch and White hall House, S.W. "Tested, Phone, London" Regent 78

Aluminium Castings (Sand and Die)

Cowan, W. & Co., 61, Old Broad, London, E.C. Kinglasses, Lond. "Cowan, Fen, London"

Bent Timber Parts

Hopton & Sons, George Street, Euston Square, London, N.W.1 "Hopton, Fenquare, London" Museum 406

Also at "Market Harborough Leicestershire" "Hoptons, Market Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds "Yes, Leeds" Central 3927, Leeds

Blowpipes (Oxy-Acetylene) –

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1 "Lumina, Vic, London" Vic 4830

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edlbrac, 'Phone, London"

Brass Sheets for Tipping Propellers—

Pratt & Co., 40, Frenchurch Street, London, E.C.3 "Portex, Fen, London"

Buildings –

Avenue 693, 699 and 7000

Boulton & Paul, Ltd., Rose Lane, Norwich. "Viaduct, Norwich" Norwich 851

Palmer, T. W. & Co., Church Road, Merton Abbey, S.W.1 Wimbledon 1315

Rubery, Owen & Co., Darlaston, South Staffs

The Wildey Co., Ltd., Salisbury House, London Wall, E.C.2 "Wildiness, Phone, London" City 2681-2

Cable Coverings and Cable Controls –

The Bowden Brake Co., Ltd., Tyseley, Birmingham. Acock's Green 103 & 104 Bowden, Acock's Green

Herbert Terry & Sons, Ltd., Redditch Springs, Redditch" Redditch 91

Carburettors –

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070

Casein—

Newtonhof, Surrey & Co., Ltd., 5, Lloyds Avenue, London, E.C.3 "Surrendum, Fen, London" Avenue 34 and 35

Celluloid (Non-Flam.)—

Grenfell & Sons, 8 Water Lane, E.C. "Greenfell, London." Central 1906

Clothing—

Burberrys, Ltd., Haymarket, S.W. Regent 2165

Dunn & Co., Ltd., Euston Road, N.W.1 "Dunnetic, London" Museum 3405 6

Mole, Lewis & Co., Ltd., Norwich "Mole, Norwich" Norwich 482 (4 lines)

Mulberry, Brooklands, Byfleet "Mulberry, Weybridge" Weybridge 345 Byfleet 127

Nelson Aircraft Manufacturing Co., Ltd., 17, Dartmouth Street, Westminster, Easton "Nelsonair, Vic, London" Victoria 3373

Norman & Grand Aircraft Co., Cricklewood, London, N.W.2 "Normagrand, Cricklewood, London" Willesden 2455

Norman Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 48

The Regent Carriage Co., Ltd., 126-132, New King's Road, Fulham, S.W. "Regentcar, London" Putney 2249-2241

Roe, A. V., & Co., Ltd., Manchester "Tripoli, Manchester" City 8531-8531, Manchester

Saunders, S. L., Ltd., Cox Cowes, I.O.W. "Camise, East Cowes" Cowes 109

Short Bros., Rochester; Pochurch and Wardrobe House, S.W. "Tested, Phone, London" Gerrard 2328 or 378

Sopwith Aviation Co., Ltd., Kingston-on-Thames "Sopwith, Kingston" Kingston 1088 & lines)

Standard Aircraft Manufacturing Co., 35, Bow Common Lane, E. East 2023

W. G. Tarrant, Byfleet, Surrey Byfleet 2 & 3

Tarrant, Byfleet Tarrant, Byfleet

Thames Aviation Works, 141, Curtain Rd., E.C.2 Vic. 1, Imperial Court, Byfleet Street, Knightsbridge, S.W.1 "Vickerfel Knights, London" Kensington 1850

Young & Gillow, Ltd., Hammersmith "Watson Ox, London" Museum 5000

Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 126

White & Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 10

Whitehead Aircraft (1917), Ltd., Rye Road, Surbiton "White, Richmond, Surrey" Richmond 1788-1

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84

Airships—

Wolseley 1314

Airships, Ltd., High Street, Merton

Short Bros., Rochester, Eastchurch and White hall House, S.W. "Tested, Phone, London" Regent 78

Aluminium Castings (Sand and Die)

Cowan, W. & Co., 61, Old Broad, London, E.C. Kinglasses, Lond. "Cowan, Fen, London"

Bent Timber Parts

Hopton & Sons, George Street, Euston Square, London, N.W.1 "Hopton, Fenquare, London" Museum 406

Also at "Market Harborough Leicestershire" "Hoptons, Market Harborough" Market Harborough 13

Engines and Parts

Allen, W. H. & Co., Ltd., Bedford "Pump, Bedford" Bedford No. 1

Arrol-Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-28.

The Bolton Steel Piping, Ltd., The Broadway, Cricklewood, N.W.2 Hampstead 1300

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1 "Beardore, London" Gerrard 258

Dublin Iron Works, Ltd., 18, Tavistock Street, Victoria Street, London, S.W.1 "Aeroplight, Vic, London" Victoria

Gordon Watson & Co., Ltd., Westbridge, "Mercedes, Westbridge" Wandsworth 2211

Green Engine Co., Ltd., Tyseley, Birmingham

Gwynnes, Ltd., Hammersmith, W. "Gwynne, Hammersmith" Hammersmith 1911

Napier & Son, D., Ltd., 14, New Wellington Street, London, W.C.2 "Napier, London" Gerrard 8926

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolls, London" Gerrard 1634 3-6

Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 082

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Gnomerhone, London" Waldhamsow 48

Electrical Accessories—

Belling & Co., Montague Road, Edmonton, N.18 "Belling, London" Mid'sex 1

Johnson & Phillips, Ltd., Charlton, S.E.7. "Jonel, London" Central 2207, London

Mann, Egerton & Co., Ltd., 127, Upper Thames Street, London, W.1 "Metalectric, Phone, London" Museum 4

Premier Electric Heaters, Ltd., 358-362, Broad Street, Birmingham "Premheat, Birmingham"

The Rotax Motor Accessories Co., Ltd., Willesden Junction, Harlesden, London, N.W. "Rotaxites, London" Willesden 32

Rubery, Owen & Co., Ltd., Darlaston, South Staffs

The Wildey Co., Ltd., Salisbury House, London Wall, E.C.2 "Wildiness, Phone, London" City 2681-2

Johnson & Phillips, Ltd., Charlton, S.E.7. "Jonel, London" Central 2207, London

Electric Cables—

E. Kalker & Co., Coventry "Kalker, Coventry"

Johnson & Phillips, Ltd., Charlton, S.E.7. "Jonel, London" Central 2207, London

Electric Lighting and Power—

E. Stanley & Co., Ltd., Willesden Junction, N.W.10 "Stanley, Willesden" Willesden 1411

Johnson & Phillips, Ltd., Charlton, S.E.7. "Jonel, London" Central 2207, London

Mann, Egerton & Co., Ltd., 127, Upper Thames Street, London, W.1 "Metalectric, Phone, London" Museum 4

Installing Engineers

Electro Platers and Metal Polishers' Engineers

W. Canning & Co., 133-137, Great Hampton Street, Birmingham. "Mildew, Birmingham" Birmingham 3622 Central

Enamel –

Silico Enamel Co., New Cross, London, S.E.

Flare Lights

Imperial Light, Ltd., 123, Victoria Street, Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edlbrac, 'Phone, London"

Flexible Shafts (Self-Contained)

Herbert Terry & Sons, Ltd., Redditch Springs, Redditch" Redditch 91

Fluxes—

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edlbrac, 'Phone, London"

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth "Flyer, Winton, Bournemouth" Winton 1041

Cambridge School of Flying, Ltd., Aeroplane Hangars, 308, St. Andrew's St., Cambridge "Aeroplane, Cambridge" Cambridge 5 and 6

Furniture (Office) –

Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.

Galvanising –

Boulton & Paul, Ltd., Rose Lane, Norwich "Viaduct, Norwich" Norwich 851

Gauges—

J. A. Prestwich & Co., Northumberland Road, Tottenham, N.17

Gears—

Moss Gear Co., Ltd., Lower Essex Street, Birmingham "Mogear, Birmingham" Central 1

British Celanese Co., 8, Waterloo Place, S.W.1 "Celanese, London" Regent 4041

The British Thomson Co., Ltd., 19, Regent Street, S.W.1 "Rudiospren, Piccy, London" Gerrard 250

Ceilon, Ltd., 22, Cork Street, London, W.1 "Ajaxh, Rec, London" Gerrard 440

Clerk, Ingram, Robertson & Co., Ltd., Walter House, 418, Strand, Charing Cross, W.C.2 "Pneumatic, Westrand, London" Regent 90-5

Glue –

Cannon, B. & Co., Ltd., Lincoln, Office, 111, Cannon Street, E.C. "Beecolin, Cannon, London" C

Improved Liquid Glues Co., Ltd., 61, Regent Street, Piccadilly, W.1 "Improglue, Piccy, London" Regent 1181.

Wapp, Forbes & Co., Ltd., Wapp Works, Meadow Co. & Arthur Street, E. Bow, Old Road, Wm. & Sons, Ltd., 9, Wapping, E.

Goggles—

Triplex Safety Glass Co., Ltd., 39, Regent Street, Piccadilly, W.1 "Splinto, Piccy, London" Regent 1181

Hack Saw Blades & Machines—

Victor Saw Works, Ltd., 2, Victor Street, Fosbury Circus, E.C. "Victorsaw, Phone, London" London 1

Heating and Ventilating—

Chas. P. Kennell & Co., Ltd., 64, Southwark Street, London, S.E.1

Sturtevant Engineering Co., Ltd., 72, Victoria Street, London, S.W. "Sturtevant, London" Central 2121

Hollow Spars –

McGruer Bros., 21, Holles Street, Commercial Wharf, Limehouse, E. "Mcgruer, London" Limehouse 1911

Robert Young's Construction Co., Ltd., 4, Canbury Street, Essex Road, London, N. "Youngsco, London" Central 1

Instruments—

British Wright Co., Ltd., 22, Chenies Street, W.C.1 "Britwright, London" Museum 1

The Great Eastern Street Motor Co., Ltd., 134-140, Great Eastern Street, Bethnal Green, London, E.C. "Motorcraft, London Wall 6900

Herbert Frost & Co., Ltd., 76, Pinfold Street, "Frobobe, Birmingham" Central 5

MacLennan, J. & Co., 30, Newgate Street, E.C.1 (and 5, Glasgow) "Lopes, Leeds, Threads" City 3115

Motor Cars—

Arrol-Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-28.

Mann, Egerton & Co., Ltd., 379-391, Euston Road, London, N.W.1 "Mangerton, Euston, London" Museum 4

Standard Motor Car Co., Coventry "Standard, Coventry" Coventry 330 (4 lines).

Nameplates and Labels—

British Metal Engraving Co., Ltd., Kingston-on-Thames

The Clegg Metal Engraving Co., Worsley "Clegg, Worsley" Worsley

Observation Panels—

Triplex Safety Glass Co., Ltd., 39, Regent Street, Piccadilly, W.1 "Splinto, Piccy, London" Regent 1181

Parachutes—

Lowe, Reginald

L. R. Composite Metal Patents, Ltd., 144, Fleet Street, Upper Thames Street, London, E.C. "Supermarine, Fen, London" Avenue 32 and 3207

Pattern Making

Fredk. Ward & Co., 8 and 8 Bishop Street, Upper Rosoman Street, W. Phone 4443

Piston Rings—

British Cloth & Piston Ring Co., Ltd., Cloth House, Lower Thames Street, London, E.C. "Cloth, London" City 6342

The Standard Piston Ring and Engineering Co., Ltd., Duke Road, Chiswick, W. "Selsero, Phone, London" Chiswick 1181

Parts and Fittings

Allen, W. H. & Co., Ltd., Bedford "Pump, Bedford" Bedford No. 1

Arrol-Johnston, Ltd., Dumfries "Motor, Dumfries" Dumfries 281-28.

The Bolton Steel Piping, Ltd., The Broadway, Cricklewood, N.W.2 Hampstead 1300

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1 "Beardore, London" Gerrard 258

Dublin Iron Works, Ltd., 18, Tavistock Street, Victoria Street, London, S.W.1 "Aeroplight, Vic, London" Victoria

Gordon Watson & Co., Ltd., Westbridge, "Mercedes, Westbridge" Wandsworth 2211

Green Engine Co., Ltd., Tyseley, Birmingham

Gwynnes, Ltd., Hammersmith, W. "Gwynne, Hammersmith" Hammersmith 1911

Napier & Son, D., Ltd., 14, New Wellington Street, London, W.C.2 "Napier, London" Gerrard 8926

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolls, London" Gerrard 1634 3-6

Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton" Wolverhampton 082

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15

Power Presses and Dies

Bliss, E. W. & Co., 22, Pocock Street, Blackfriars Road, London, S.E.1 "Blissh

Presswork—

London Hop 4340.

Robert Owen & Co., Darlaston, South Staffs

Terry, Herbert & Sons, Ltd., Redditch "Springs, Redditch" Redditch 91

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich" Norwich 851

Eberle Boat & Co., 1, Nelson Square, Bolton Terrace, Kingston-on-Thames "Eberle, Kingston" Kingston 674

Integral Propeller Co., Ltd., "Avipro, Hyde, London" Hendon & Kingsbury 104

Lang Propellers, Ltd., Weybridge "Aeroschas, Weybridge" Weybridge 522 and

Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines)

Oddie, J. & Co., Leeds "Oddies, Leeds" 21214 Leeds

Stanley Vernon Co., 67, Kingsland Road, E. City 8337

Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 126

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth, Letchworth 20

Radiators –

Gallay Radiator Co., Ltd., 168, Great Portland Street, W.1 "Gallaycor, Wesdo, London" Mayfair 4826.

Rigging for Aircraft—

Cadbury, C. & Co., Ltd., Waterhall Estate, Chertsey "Cadbury, Weybridge" Weybridge

Rubber Tubing & Accessories

Hancock, Jones, Lane, Ltd., 300, Gosswell Road, London, E.C.1 "Mastic, London" City 3511 and 3512

Safety Belts—

Hughes & Hall & Son, 38, West Street, Manchester "Speedy, Manchester" City 4432

Screw-driving Machines—

Russell Jones, Redditch, Ltd., Camberworth, Redditch "Jonsers, Redditch" Redditch 74

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds" Roundhay 345

Gosport Aircraft Co., Gosport "Flight, Gosport" Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines)

The Norman Thompson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 48

Short Bros., Rochester "Seaplanes, Rochester" Chatham 62

Supermarine Aviation Co., Ltd., Southampton "Supermarine, Southampton" Southampton 1337

Seats for Aeroplanes—

Bowser, E., 50, Park Lane, Leeds, Leeds 21953.

Searchlights and Landing Lights

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edlbrac, 'Phone, London" 3540 Victoria (3 lines)

The Rotax Motor Accessories Co., Ltd., Willesden Junction, N.W. "Rotaxites, London" Willesden 32

Shackles –

British Golf Shell Ring Co., Ltd., Hounslow, Middlesex "Golfshell, Hounslow" Hounslow 254

The Rotax Motor Accessories Co., Ltd., Willesden Junction, N.W. "Rotaxites, London" Willesden 2840

Sheet Metal Pressings—

Nelson & Pollock, Ltd., Offices, Birmingham "Nelson, Offices, Phone, London" (3 lines)

Arnold & Sons, Lawrence Road, Tottenham, N.15

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds" Roundhay 345

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham "Briscoe, Birmingham" Central 559

Bristol Metal (Kingston), Ltd., Kingston-on-Thames

Ford & Yarnold Co., Ltd., Westwood Road, Aston, Birmingham "Fordyard, Birmingham" Aston 1497

Gilbert Owen & Co., Dartmouth, South Staffs. "Owen, Phone, London" Vic 4840

Sheet Metal Work

The Acetylene Corporation of Great Britain, Ltd., 49a, Victoria Street, Westminster, S.W.1 "Lumina, Vic, London" Vic 4830

Arnold & Sons, Lawrence Road, Tottenham, N.15

Bristol Metal (Kingston), Ltd., Kingston-on-Thames

Robert Owen & Co., Darlaston, South Staffs

The Selsdon Aviation Engineering Co., Ltd., 1, Allendale Street, Putney, S.W.1 "Selsero, Phone, London" Regent 1181

Arthur Hill & Co., Manchester Road, North Kensington, W. Park 1443.

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines) "Edlbrac, Phone, London."

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Protocol, Westcent, London" Museum 2655

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 255

Rimmell, Eng & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1 "Rimmell Rg, London" Gerrard 7768

Springs—

Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 322.

Terry, Herbert & Sons, Ltd., Redditch "Springs, Redditch" Redditch 91 (3 lines)

Stampings—

Guthrie, J. & Son, 30, St. Mary Axe, E.C.3 Avenue 1432

Steel –

Allen, Edgar & Co., Ltd., Sheffield "Allen, Sheffield" Sheffield 4097

Firth, T. & J. & Sons, Sheffield "Firth, Sheffield" Sheffield 2240 to 2245

Guthrie, J. & J. & Son, 30, St. Mary Axe, E.C.3 Avenue 1432

Sicklin, Bernard & Co., Birmingham "Bernico, Birmingham" Smethwick 294

Steel Stamps and Markings

John Morton & Sons, Cleveland Steel Mills, Ltd., Darlington "Dasher, Phone, London" East 3333 (2 lines)

Steel Tubes for Aeroplanes –

Accles & Pollock, Ltd., Offices, Birmingham "Accles, Offices, Phone, London" (3 lines)

Tanks & Cowls for Aeroplanes

Zephyr Ventilating Co., Ltd., Ty pont Road, Bristol. Telegrams, Zephyr, Bristol

Taper Pins—

Mountford, Ltd., Birmingham, Ltd., Mountford, Birmingham "Taper, Birmingham" Kings Norton 262

Tapes and Smallwares—

Mayer & Schoen & Co., 5, Savage Street, E.C. and Glasgow City 3115

Timber –

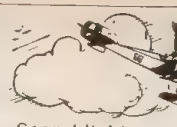
Brown, R. F. & F. W., Wallington, Surrey & Nottingham Nottingham 1311

Hopton & Sons, George Street, Euston Square, London, N.W.1 "Hopton, Fenquare, London" Museum 406

Also at Market Harborough, Leicestershire "Hoptons, Market Harborough" Market Harborough 13

J. Oxen & Son, Ltd., 1002, Borough, High Street, S.E.1 "Buchenon, London" Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page



Buyers' · Guide.

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.
Mann, Egerton & Co., Ltd., 117, Cleveland Street, London, W. Museum 70 (4 lines). Installing, Eusroad.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord.Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros. Bilston." Bilston 10.

Varnishes—
The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London" Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1305.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers— Avenue 1432.
Guthrie, J. B & Son, 30, St. Mary Axe, E.C.3.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs— N.15.
Arnold & Sons, Lawrence Road, Tottenham, Barimar, Ltd., 10, Poland Street, W.1. "Bariquamar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Winflector, London." Regent 5010.
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London" Regent 1340

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury St., London, E.C.2. "Setscrew, Finsquare, London." London Wall 1082.
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432

Wires and Cables—
Bruntons, Musselburgh, Scotland. "Wiremill, Musselburgh" Musselburgh 28.
Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Wirework— (3 lines).
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdale. "Robinson, Rochdale." Rochdale 467
Sagar, J., & Co., Ltd., Halifax. "Sawtooth, Halifax." Halifax 136.
Wadkin & Co., Leicester. "Woodworker, Leicester." Leicester 3614.

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.G.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

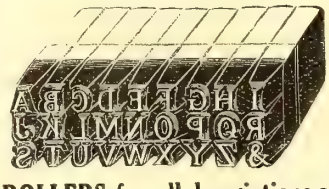
Telephone: 1153 and 1154, KINGSTON. Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.

CONTRACTORS TO WAR OFFICE, ADMIRALTY AND AIR BOARD.

'Phone—East 3331 (2 lines). Wires—Dayhur, Phone London.



STEEL STAMPS





And MARKING ROLLERS for all descriptions of Aircraft Parts.

BRANDING IRONS. Inks and
STENCIL PLATES. Brushes.

JOHN MEERLOO & SONS,

CLEVELAND STREET, MILE END, LONDON, E.1.



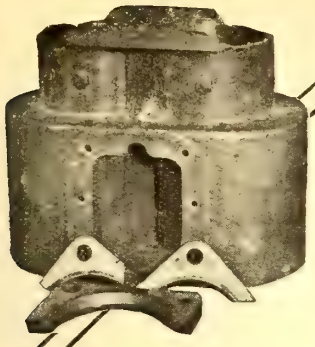


Patent No. 4704/15.

McGRUER SPARS are THE ACME of STRENGTH and LIGHTNESS

Particulars from:—

McGRUER BENTWOOD HOLLOW SPAR Co.,
Commercial Wharf, Lambeth, LONDON, S.E.1.



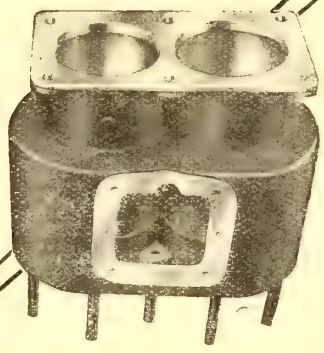
"The best job I have ever had done."

This is what the man to whom these agricultural tractor engine cylinders belonged said, when he came to collect his repair. This is what everyone either thinks or says about the job he sends to :—

THE NEW WELDING Co.

Ask any Engineer

in your neighbourhood where he sends his welding repairs, and send yours to where ninety-nine out of every hundred send theirs—THE NEW WELDING CO. The Engineer has proved for himself that there is no repair service in the country where he can obtain a better job, at a more reasonable price, or in quicker time.



THE NEW WELDING Co., 26, Rosebery Av., London, E.C.1.
Telephone: 5252 Holborn. Telegrams: "Windoneeda, Holb, London."

Telephones—Dalston 872. London Wall 9766. Hampstead 4768. Hornsey 1105. Cardiff 2043.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE SAW MILL PLANTS,
——— FOUR OTHER FACTORIES, ———
AND TWO YEARS' EXPERIENCE.

Postal Address only:

141, CURTAIN ROAD, E.C.2.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

WITTON

Fuselages
Chassis
Tails
Cowling.

AIRCRAFT

Airscrews
or
Complete
Machines.

Offices:
13, Goodwin Street,
Fonthill Road,
Finsbury Park, N.

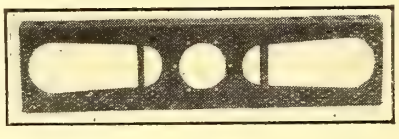
Phone: North 2110.

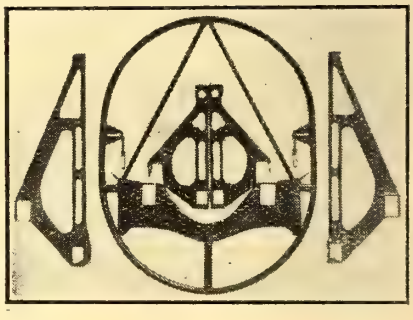
WITTON, WITTON & CO.
Partners { Charles William Wells.
William John Wells.

MAKERS OF THE "WITTON" PIANO.

Sopwith Engine Plates in Stock, Complete Sets.
Speciality Copper Pipe Work.

WRITE FOR PRICES.
THEY ARE RIGHT.





ALL PARTS PASSED A.I.D. AT OUR WORKS.

SWIFT Aviation Ltd.

Contractors to H.M. Government.

'PHONE—
762 KINGSTON.

KINGSTON

'GRAMS—
"SWIFT, KINGSTON."

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams
JONAS,
SHEFFIELD.

REGISTERED
I C N O
TRADE MARKS.

Telephone
No. 4660.
PRIVATE BRANCH
EXCHANGE.

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
for severely strained parts, such as Gear Wheels, Gudgeon Pins etc.

SHEFFIELD.

INCREASED OUTPUT

DEMANDS

GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

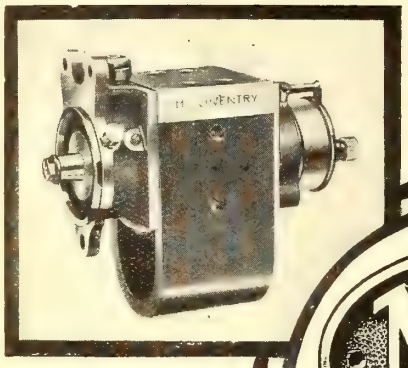
DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

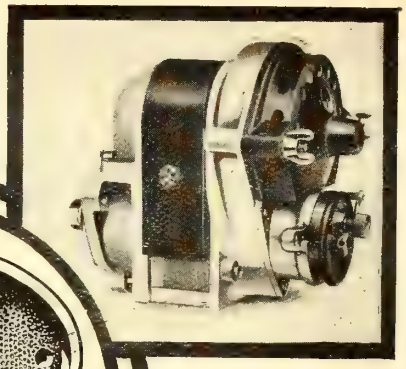
The Wilfley Company, Limited

SALISBURY HOUSE, LONDON WALL, E.C. 2.

Telegrams: "Wrathless, Phone, London." Telephones: City 2681 & 2682.



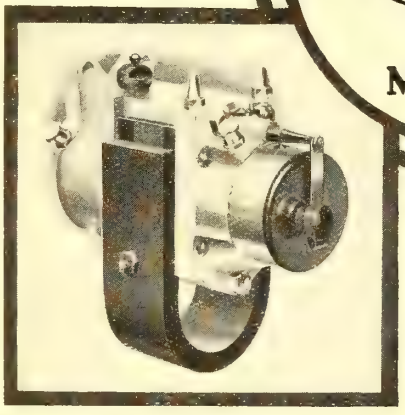
Type A.D.S



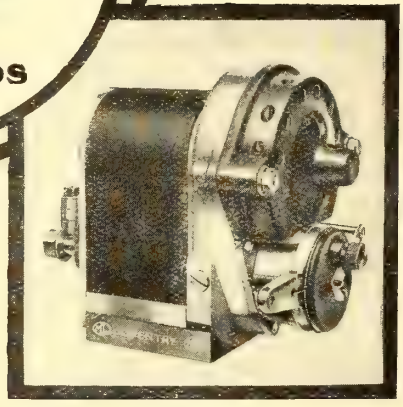
Type P.L. 7.

M-L

All-British
Magnetos



Type P.L.R.



Type P.M. 6.

All = British
Magnetos
for
Aircraft.

THE strong features of M-L All-British Magnetos which have made the aero types so successful are lightness, efficiency and effective sparking at very low speeds.

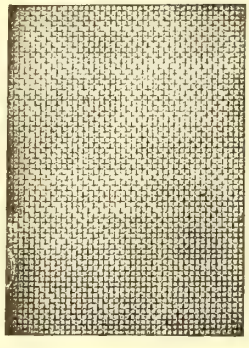
M-L Magnetos are smaller, lighter and stronger, and are more efficient than any pre-war magnetos of equal electrical output. All parts are interchangeable, "spares" can be quickly supplied.

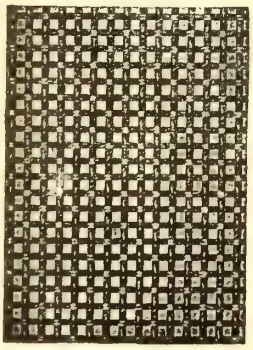
The M-L Magneto Synd., Ltd., have been making magnetos for Aero Engines since 1914.

The illustrations show some of the M-L All-British Magnetos for Aircraft. Types A D S and P L R are designed for Rotary Engines. Types P L 6 and P L 7 are for 6 and 7 cylinder Radial Engines. Types P L 6 and P M 6 are for Vertical and V Type Engines.

Descriptive Lists sent on request.

The M-L Magneto Synd., Ltd.
Coventry.





AIR BOARD STANDARD PETROL GAUZE—CONTROLLED BY THE AIR BOARD.

WOVEN WIRE CLOTH
IN ALL METALS AND
IN ALL MESHES AND STRENGTHS.

MANUFACTURED BY
N. GREENING & SONS, LTD. ESTABLISHED 1790.

16 FINSBURY STREET, E.C.2.

Telegrams—"SETSCREW, FINSQUARE, LONDON."
Telephone No.—LONDON WALL 1082.

WARRINGTON.

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY: 2 pints of glue.
LOADING: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 25% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18

Post-War

To-day, we are passing through the intervening period—Many of us are exceedingly pre-occupied but—

DON'T LET US BE UNPREPARED!

Our own desire to avoid that weakness has impelled us to put our plans and policy for After-War well to the fore. Repetition Work will be our speciality and we ask you to co-operate by discussing with us your possible requirements.

WILL YOU DO SO?
—we await your news.

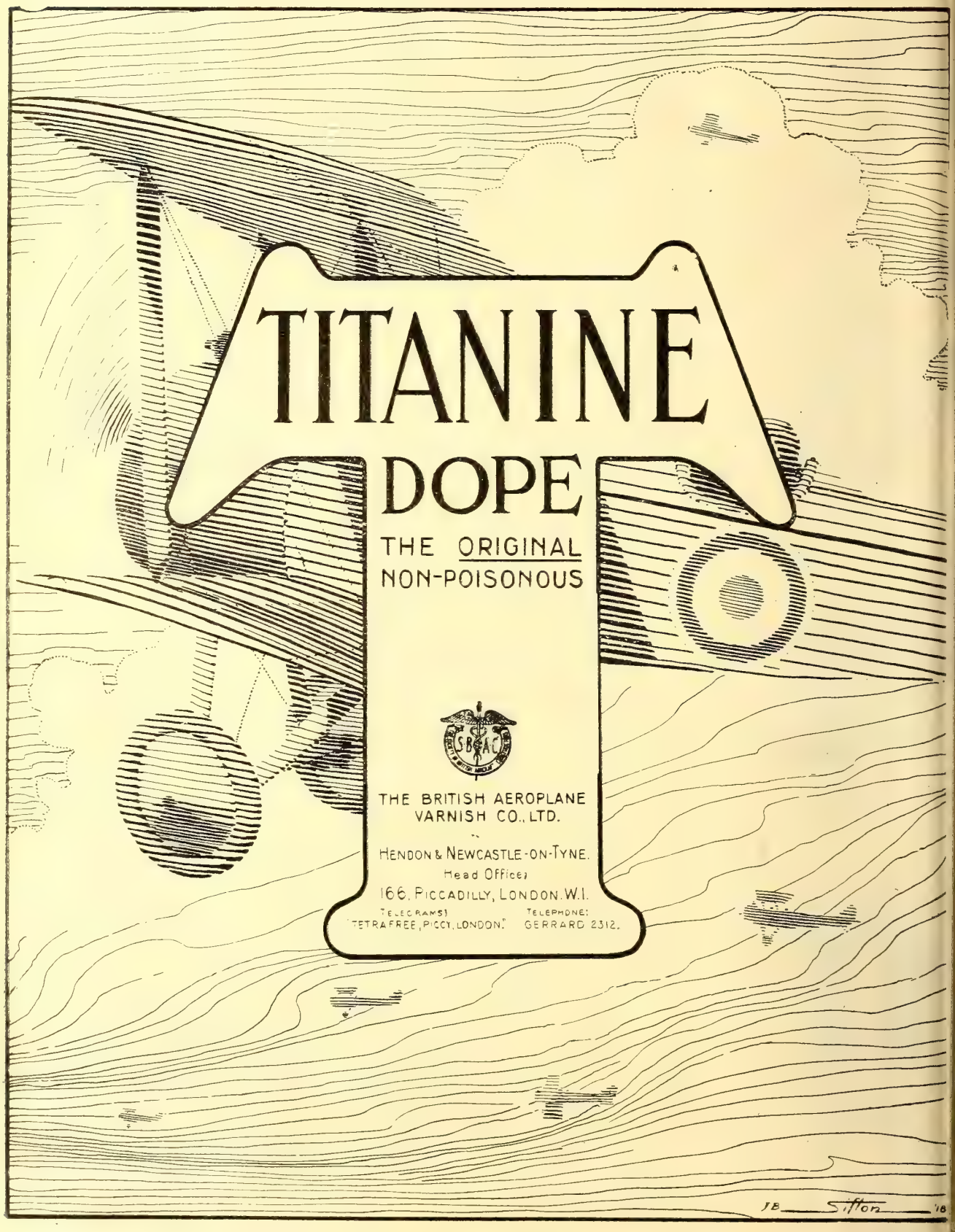
SUCKLING

Wm Suckling & Sons

KINGSWAY HOUSE,
ALBION ST., BIRMINGHAM.

LONDON: MORLEY HOUSE,
HOLBORN VIADUCT :: E.C.1.

1391


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
S.B.A.C.
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON, W.I.
TELEGRAMS:
"TETRAFREE, PICCY, LONDON."
TELEPHONE:
GERRARD 2312.
JB Sutton '18

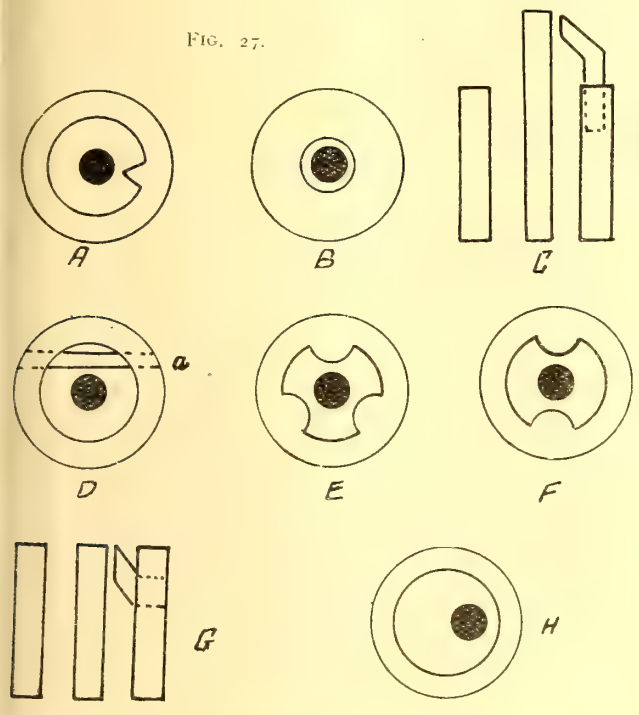
To overcome this difficulty some manufacturers make their plugs with a removable centre-pin. Here the pins may be removed and washed in petrol to remove the carbon.

PIN POINTS.

There is considerable difference of opinion in designing circles concerning the most efficient sparking points of a plug. So much so, that it would not be exaggerating in the slightest degree if it were said that there are scores of sparking plugs on the market with differently designed points. Some of these are illustrated in Fig. 27.

In this diagram A shows the sparking points of the well-known Lodge aero plug. This plug is one of the most satisfactory used in modern aero engines. It will be noticed that a

FIG. 27.



diamond point is protruding towards the centre pin. If a short circuit should develop in this plug immersion in a bath of petrol for a few hours will remove the soot or carbon. Under no consideration must the mica insulation be scratched.

B illustrates the points of a plug that was claimed to be the very essence of plug design. The chief point claimed for this was that it could not miss-fire, owing to the very short distance from the centre-pin to any part of the interior of the plug. This might have been so had it not been overlooked that it was possible for "the very short distance" to be choked with soot. This is actually what happened when the plug was tested, but not before large quantities had been placed on the market.

C is a fairly satisfactory plug. It is a little weak where the outside point is pinned to the material.

D is a simple plug, but it is not so satisfactory as some that have been mentioned.

The outstanding peculiarity in the design of the points is shown at *a*. Here, a small bar of nickel is inserted through holes drilled in the sides of the plug, the ends being riveted over. The centre pin point is about .012 in. from this bar. On paper this looks like a satisfactory job, but it was found that, after a short run, the space between the inside of the bar and the inside of the plug made a good receptacle for oil. Thus it is very seldom used for aero engines.

E illustrates a very satisfactory plug. It has three sparking points, which at high speeds almost guarantee a continuous spark. At low speeds, the spark being divided, there is a tendency to miss-fire.

F is a plug much inferior to that illustrated at E.

G is a well-known type of plug and it is very much favoured. It will be observed that it is similar in construction to that illustrated at C. The same fault is prominent in this plug as was described at C. That is, it is a little weak where the outside pin is connected to the outside of the plug.

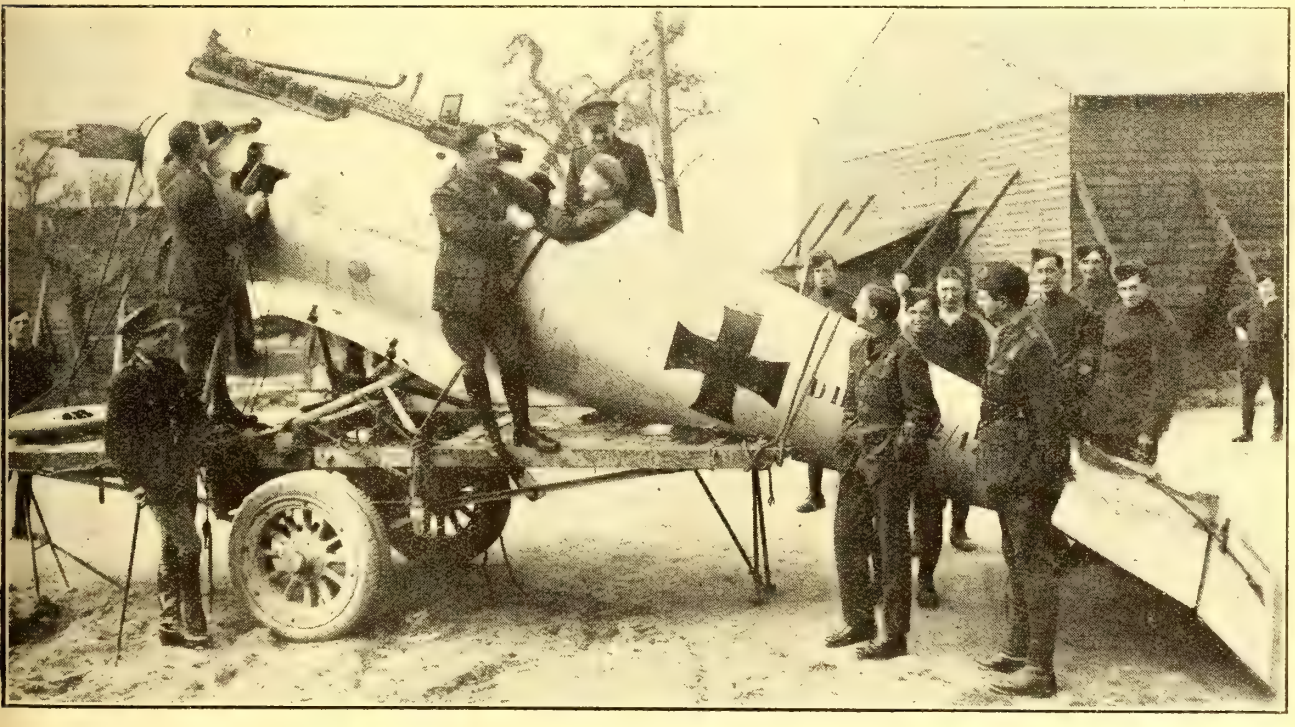
H is a plug not often used. Here the centre pin is eccentric, and the spark gap is between it and the inside of the plug. After a very short run, the centre point becomes coated with a deposit of carbon which short-circuits the sparking points before the extreme edge of the plug is reached. This is a serious disadvantage.

PLUG TERMINALS.

It is very surprising that, since sparking plugs were invented, there appear to be little or no improvements in the design of the terminals. This is not a large item yet it is most important, as one often hears complaints of terminals working loose during a run. This complaint became such an inconvenience that orders were issued to air mechanics to see that all sparking-plug terminals were taped up with Blackley tape before an engine was taken on a run.

It is essential that plug terminals should be a good sound job, because, if one works loose it is hardly possible to tighten it up during a run.

(To be continued.)



The Fuselage of a captured Pfalz Biplane. An interesting feature is the origin of the bottom planes which consists of the shaping of the underside of the fuselage to a cambered section.

THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane from the current Official Patents Records :—

Patent Applications.

Appelbee, A. S. High-speed land transport with aerial lift. No. 7851. May 10th.
Beeby, A. R. Bomb-dropping apparatus for aeroplanes, etc. No. 7840. May 10th.
Baker, R. H. Aerial bombs. No. 7666. May 7th.
Bottomley, J. A. Planes of aeroplanes. No. 7763. May 9th.
Brettell, W. J. Projectile for use against aircraft. No. 7606. May 6th.
Brook, C. F. Clinometers for aircraft, etc. No. 7927. May 11th.
Butlers, Ltd. Strainers or turnbuckles, and manufacture thereof. No. 7554. May 6th.
Cattle, A. J. Manufacture of wooden spars, struts, etc. No. 7924. May 11th.
Contantinesco, G. Controlling-devices for aircraft, etc. No. 7797. May 9th.
Cramond, W. F. Horizontal and lateral level indicator for aeroplanes, etc. No. 7912. May 11th.
Crooke, W. R. Machine-gun batteries for aircraft, etc., platforms. No. 7542. May 6th.
Gaff, W. R. Aeroplanes. No. 7810. May 9th.
Hamilton, F. T. S. Range and height finder. No. 7827. May 10th.
Harvey, E. A. Dopes for fabrics. No. 7740. May 8th.
Hubbard, B. T. Pendulum clinometers for steering aircraft. No. 7960. May 11th.
Hunt, N. H. Sighting-apparatus for use on aircraft. No. 7865. May 10th.
Jacot, L. Doping aeroplanes. No. 7951. May 11th.
Jezzi, P. G. L. Screw propellers for aircraft. No. 7779. May 9th.
Macey, T. A. Indicating-means for use on aircraft, etc. No. 7628. May 7th.
McGruer, E. Hollow wooden spars or tubes. No. 7864. May 10th.
Matthews, E. R. A. Means for extinguishing fires on aircraft. No. 7902. May 10th.
Morton, W. Aircraft. No. 7935. May 11th
Robbins, J. Preparation of dope for treatment of fabrics for aircraft. No. 7907. May 10th.
Sage & Co., F. Fabrics for aircraft, etc. No. 7812. May 9th.
Short, H. O. Floating structures for landing, launching, or loading hydro-aeroplanes, etc. No. 7642. May 7th.
Smith, E. G. R. Angle-meter for aircraft, etc. No. 7695. May 8th.
Taylor, T. Apparatus for navigating aircraft. No. 7613. May 7th.
Valeri, R. F. S. Screw propeller for aviation made of plywood, and process for manufacture of same. No. 7730. May 8th.
Watkins, H. E. Level or position indicator. No. 7676. May 8th.
Whitehead, J. A. Floating aerodrome. No. 7634. May 7th.
Angell, La V. H. Air-cooled engines. No. 8090. May 14th.
Belcher, W. Aerial floating mines for bombs and poison gas. No. 8236. May 16th.
Burnham, H. Rigid airship construction and propulsion. No. 8231. May 16th.
Campbell, C. H. Rapid-firing device, and projectiles for same, for use by aircraft. No. 8113. May 15th.
Chinnock, W. J. Spring seats, cushions, etc., for aeroplanes, motor-cars, etc. No. 8068. May 14th.
Clarke, T. W. K. Aircraft bracing-wire connections. No. 8141. May 15th.
Coldwell, D. K. Landing-devices for aircraft. No. 8333. May 17th.
Cooke, W. Clinometer for aeroplane or submarine. No. 8270. May 17th.
Fairey, C. R. Control of aeroplanes. No. 8351. May 17th.
France, A. G. Strainers or turnbuckles for wires. No. 8053. May 14th.
Green, J. F. Means for propelling aircraft. No. 8015. May 13th.
Holle, A. A. Aeroplanes. No. 8064. May 14th.
Hone, G. J. Instrument for indicating deviations of aircraft. No. 8304. May 17th.
Kennedy, C. J. H. Mackenzie. Aircraft control mechanism. No. 7994. May 13th.
Kennedy, C. J. H. Mackenzie. Shock-absorbing devices, and their application to aeroplanes. No. 7995. May 13th.
Kennedy, C. J. H. Mackenzie. Aircraft bracing-wire connections. No. 8141. May 15th.
Neal, J. Angle or level indicator for aircraft. No. 8178. May 16th.
Soc. Anon des Etblmt, Nieuport. Penetration cones for aircraft. No. 8336. May 17th.
Stocks, H. B. Bombing-apparatus for aeroplanes. No. 8173. May 15th.
Sykes, H. W. Interrupter gears for aircraft guns. No. 8062. May 14th.
Allen, R. Gun mountings for aeroplanes. No. 8409. May 24th.
Bagley, G. H. Device for carrying and discharging shells, bombs, or torpedoes from aircraft. No. 8398. May 21st.
Boulton & Paul. Aircraft. No. 8577. May 23rd.
British Westinghouse Electric & Manufacturing Co. Structural elements and parts for aeroplanes. No. 8587. May 23rd.
Cawdery, J. W. Parachutes. No. 8494. May 22nd.
Cripps, H. C. Air or water propeller. No. 8495. May 22nd.
Davies, A. Means for aerial or marine propulsion. No. 8675. May 25th.
Dewar, J. Aeroplane hangars, etc. No. 8537. May 22nd.
Hustler, F. C. Aeroplanes. No. 8477. May 22nd.
Jacob, H. G. R. Means for control of aircraft. No. 8469. May 21st.
Kettelwell, H. M. Fairings for aircraft. No. 8590. May 23rd.
Massey, L. Aeroplane spars, struts, longerons, bearers, etc. No. 8553. May 23rd.
Soc. Nauton Freres et de Marsac. Process for diminishing visibility of objects and preventing their being picked up by an artificial beam of light. No. 8655. May 24th.
Wise, W. G. Automatic angle of inclination recorder. No. 8604. May 24th.
Andrews, E. J. Aeroplanes. No. 8970. May 31st.
Bowden, W. Means for operating controls of engines of aeroplanes. No. 8909. May 30th.
Brown, E. E. Aeroplane wings having metal frames. No. 9034. May 31st.
Chadderton, I. Angle indicator for aeroplanes. No. 8772. May 28th.
Christmas, W. W. Aeroplanes. No. 8888. May 29th.
Cripps, F. R. Device for adjusting tension in wires. No. 8770. May 28th.
Dudakoff, S. Combined hydroplane and motor boat. No. 9066. June 1st.
Ellis, J. Flying-level indicator for aeroplanes. No. 8914. May 30th.
Finlay, R. Anti-aircraft projectile. No. 9043. June 1st.
Gibbons, F. J. J. Appliance for carrying and dropping objects from aircraft. No. 8810. May 28th.
Kennedy-Mackenzie, C. J. H. Power plant for aircraft, etc No. 8879. May 29th.
Macdonald, K. Aero-turbine for aircraft propulsion. No. 8931 May 30th.
Mooney, D. J. Building aeroplane wings. No. 9033. May 31st.
Mullings, J. J. C. Aero or seaplane. No. 8743. May 27th.
Neale, J. Airships. No. 8924. May 30th.
Robins, T. H. Device for indicating angular position of aeroplane, etc. No. 8973. May 31st.
Roe, A. V. Design and manufacture of metal spars and struts. No. 9052.
Roots, J. D. Clinometer for aircraft. No. 8807. May 28th.
Ruck, R. M. Means for controlling aircraft. No. 9027. May 31st.
Shaw, W. R. D. Airships. No. 8922. May 30th.
Simms, F. R. Aeroplanes and hydroplanes. No. 8746. May 27th.
Terry, C. E. R. Means for indicating angular position of a machine or vessel. No. 8972. May 31st.
Uttz, W. A. Parachute equipped aeroplane. No. 9079. June 1st.

Complete Specifications Accepted, prints of which can now be obtained.

115,259. April 28th, 1917. Saunders, Ltd., S. E., Porter, S. E., and Goatley, F. Landing-runners for airships and other aircraft.
115,338. July 13th, 1917. British Emaillite Co., and Twyman, F. Measuring the tension of stretched fabrics, and apparatus used therein.
115,442. Oct. 20th, 1916. Scruby, B. Toy airships.
115,466. May 5th, 1917. Ford, L. C. Girders, beams, spars, and the like rigid structural members.
115,480. May 8th, 1917. Wells, R. F. Aerial railways.
106,612. May 22nd, 1916. Mary, A. C. Screw propellers.
115,704. May 24th, 1917. Saunders, S. E. Aeroplanes.
115,768. Nov. 3rd, 1917. Wolff, A. Propelling means of aeroplanes.
115,869. April 21st, 1917. Kerr, J. J., and Richardson, J. Machine for the manufacture of propellers for aircraft, etc.
115,898. May 22nd, 1917. Sopwith Aviation Co., and Cato, H. E. Electric couplings.
115,968. July 26th, 1917. Phillips, H. Aerofoils for aeronautical machines.
115,974. Aug. 1st, 1917. Wells, E. P. Roofs for hangars, factories, and other structures.

Abridgments of recently published Specifications.

113,829. Aeroplane Propellers. Bagnall, G. W., 22, Temple Street, Bristol.

A walnut, mahogany, or like pin, peg, or dowel used in jointing the laminæ of aeroplane propellers is formed with a screw,

GALLAY
ACHIEVEMENTS

WE GUARANTEE TO CURE
OVERHEATING

Occasions arise when radiators that were eminently suitable for winter conditions are found to be inefficient in summer.

It is not necessary to slow the machine and upset the general arrangements by fitting larger radiators.

INSTALL A GALLAY BLOCK
and the trouble will cease.

We undertake an improvement of from 15 per cent. to 50 per cent. according to type of tube block previously used.

We carry out experimental work for the leading firms, all details are treated in strict confidence.

WE DELIVER TO AIR BOARD ALLOCATION

Our designers and experience are always at our customers' disposal.

GALLAY RADIATOR CO., LTD.,

L. T. DELANEY, Managing Director.

198, Great Portland Street, London, W.1.

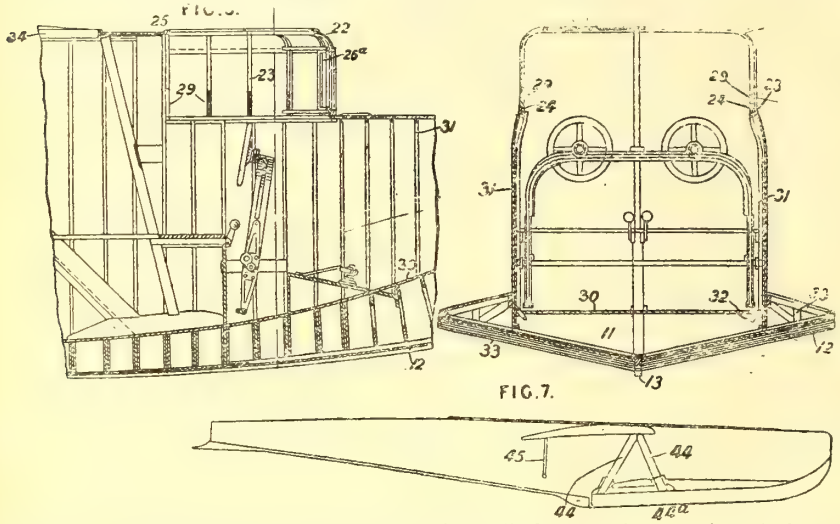
Telephone—4826 Mayfair. Telegrams—"Galyradico, Wesdo, London."

L.T.D.

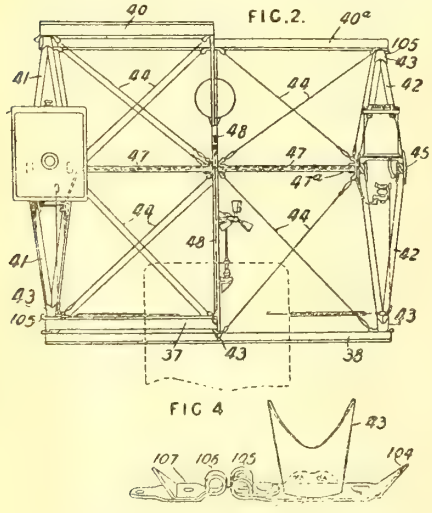
serration, or groove, compressed, rolled, cut, or turned, so as to give it a firmer grip when glued into its hole in the laminæ.

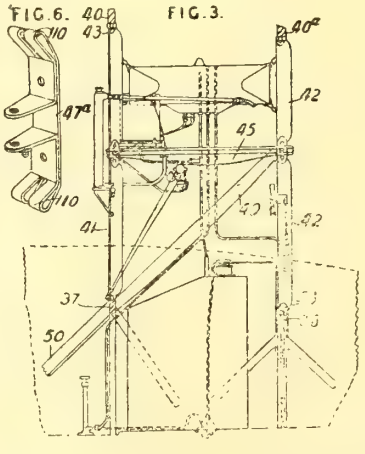
113,965. Hydro-aeroplanes. Curtiss Motor Co., Hammondsport, New York, U.S.A.—(Assignees of Curtiss, G. H.; Hammondsport, New York, U.S.A.) Dec. 6th. 1916, No. 3426/18. Convention date, Dec. 6th, 1915. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act.

A flying-boat or hydro-aeroplane, particularly of the kind described in Specification 15786/15, has the hull framework extended into the fin excrescences which flare continuously outwardly from a point near the bow to a point of maximum beam in the vicinity of the hydroplane step. The bottom planking 12 is supported by floors 11 and framing 33, and is continuous from a false keel 13 to the edge of the fins which is streamline in plan. The hull is built on frames 31 connected to the cabin floor 30 by keel braces 32 and at top is fitted with an entrance scuttle 34 provided with a flexible cover, and with a detachable transparent cabin top. The cabin top which is semi-circular in horizontal section has a celluloid cover supported by ribs 23, 25 connected to a curved cornice 22 and a lower band 24. The band 24 is secured to a combing surrounding the cock-pit by an external strip 28 and internal plates 29. Sliding panels are fitted at 26*a*. An inverted-V-shaped strut 44 connected by an horizontal board 44*a* is arranged between the lower wing beam and the fin excrescences and a strut 45 between the rear part of the wing and the side of the body. Specification 102,620 also is referred to.



113,964. Aeronautics. Curtiss Motor Co., Hammondsport, New York, U.S.A.—(Assignees of Curtiss, G. H.; Hammondsport, New York, U.S.A.) Dec. 6th, 1916, No. 3425/18. Convention date, Dec. 6th, 1915. Not yet accepted. Abridged as open to inspection under Sect. 91 of the Act.

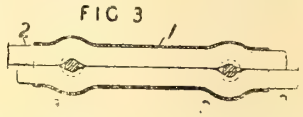




Planes, arrangement of; propelling.—The upper planes of flying-boats, such as are described in Specification 102,620, are supported from the lower planes by V-shaped braces, which may serve also to support the engines. Figs. 2 and 3 show the spars 40, 40*a* of the central section of the upper plane supported above the spars 37, 38 of the lower plane by V-shaped braces 41, 42 arranged in diamond form. Engine-supporting beams 45 may be arranged between the front and rear braces 41, 42 at the junction of the V-portions, and the beams 45 may be connected by braces 47 to a central strut 48. Diagonal braces 49, 50 further support the engine beams. The sockets 43 for receiving the V-braces are mounted on base-plates 103, Fig. 4, formed with anchoring-ears 104, and with hinge ears 105 adapted to co-operate with a corresponding hinge ear 106 on a fitting 107 carried by the detachable wing section. This wing fitting is formed with diverging ears, as shown, for attachment of the cross-bracing of the wings. The braces 47 are received in sockets 47*a*, Fig. 6, formed by folding a strip of material as shown, eyes 110 serving for attachment of the cross-bracing 44 of the central section.

114,405. Wire-couplings. Bousson, R.A., 1, Rue Jean Francois Lepine, Paris.

Wires 2 are coupled together by threading them into a flattened tube 1 of uniform cross-section so that they lie side and side, and



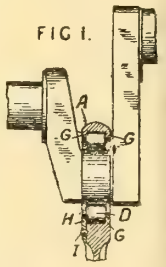
driving pointed rivets 3 through holes in the sides of the tube so that the rivets pass between the wires distorting them and consequently distorting the tube as shown.

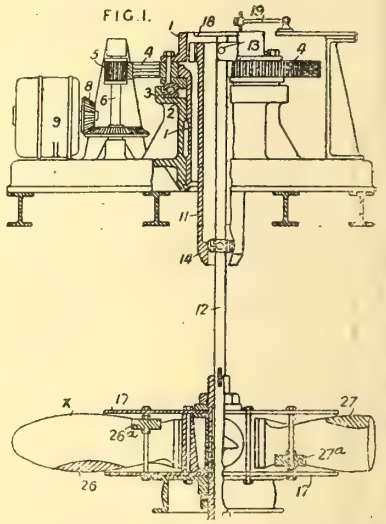
114,052. Connecting-rods. Douglas, W. (trading as Douglas Bros.), Hanham Road, Kingswood, Bristol.

The connecting-rod of a petrol engine is formed with a solid end A which is grooved to form a race for rollers D and is rounded to facilitate threading over the crankshaft. To permit of the insertion of the rollers, the crank web is cut away and the flange G is slotted, the slot being closed by a plate H sliding in a dovetail groove and secured by a screw I.

114,195. Testing Balance of Rotary Apparatus. Gott, A. E., 7, Villiers Road, Southall, Middlesex.

A method of testing the dynamic balance of rotatable bodies consists in supporting the rotor so that it is free to spin about its natural axis and in utilising the deflection of the mechanical axis of the rotor to obtain balance. For this purpose, the motor and the rotor axes are connected by a shaft having cardan or gimbal joints at the points of connection. In the form shown in Fig. 1, the motor shaft 1, of sleeve form, is supported in bearings 3 and is driven through gearing 4, 5, 8 by an electric motor 9. The hollow connector shaft 11 is fitted in the sleeve 1





by a gimbal joint 13, and at its lower end supports the rotor shaft 12 by a gimbal joint 14. On rotation, the rotor, shown as a propeller X, spins on its natural axis, and if out of balance causes its mechanical axis 12 to describe a cone, the position and size of which are recorded by a pencil 19 marking on the disc head 18 of the shaft 12. The rotor is mounted in a frame 17 to which are fitted means for adjusting the compensating weights 26*a*, 27*a* for correcting any excess masses as at 26, 27. In modifications, (1) the gimbal joint 13 is arranged below the motor shaft, and the joint 14 is close to the rotor, (2) the rotor is mounted above the joint 13 and a counter-balancing mass is mounted gimbal-wise on the lower end of the connector shaft 11, and (3) the rotor is mounted on an horizontal axis supported on pendulous and spring-controlled bearings.

ROLLS-ROYCE

A National Industry and the War

From the outset the works and organisation of Rolls-Royce Ltd. have been placed at the disposal of the Government.

* * * *

The annual accounts published show that in the aggregate the war profits of Rolls-Royce Ltd. have been less than the Company's best peace profits by 25%.

* * * *

The notable success of Rolls-Royce cars, armoured cars, and aero engines in the war will, when publication is permitted, make Britishers prouder than ever of Rolls-Royce engineering.

* * * *

Rolls-Royce expert knowledge has been placed unreservedly at the disposal of Allies who have gratefully acknowledged the assistance they have derived from it in their war endeavours.

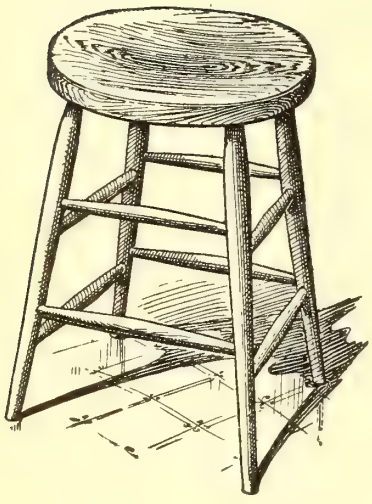
ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

THE BOARD OF TRADE

Requires all Factories to provide suitable seating accommodation for all female workers.



THE "ASCOL" STOOL

Has been specially designed to meet these requirements. It is strong, durable, stands 24 ins. high and costs

FROM 5/3 EACH

(according to quantities ordered).

We can give Large Deliveries from Stock.

Samples Sent Without Charge if Returned in 7 Days.

THE "ASCOL" BOOK

Contains a reprint of all the articles which have appeared in "Aircraft Supplies," details of A.G.S. Parts, sections dealing with "Ascol" Charts, a Beginner's Guide, and a reprint of the Glossary of Aeronautical Terms from "The Aeroplane Speaks," by kind permission of the Publishers, Messrs. McBride, Nast & Co. Price, 3/6. Special bound copies at 10/6. (Postage 6d. extra.) Firms can order their copies now to be invoiced in the usual way on publication.

ORDER YOUR COPIES NOW

THE AIRCRAFT SUPPLIES COMPANY LTD

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

Representatives in Birmingham, Manchester, Leeds, Glasgow, Newcastle-on-Tyne, Edinburgh, Southampton, Belfast, Cardiff, and the London Districts.

elephone : Gerrard 276. *Telegrams: "Upcast, Rand, London."*

G. H. MANSFIELD, Managing Director.

ASCOL.

THE AIRCRAFT TRADER

MARKET TOPICS.

June 6th, 1918.

COPPER.—Now the official price in U.S.A. has been fixed, business is moving more freely and orders are being placed for forward delivery. Supplies both here and in U.S.A. are very favourable, and the output is being well maintained. Furthermore, complaints do not appear to be prevalent of delay in getting supplies to the refineries. Official prices here remain unchanged.

TIN.—The position of this market is much easier and a fair amount of Tin is being offered. Buyers do not, however, appear to be keen to buy for forward delivery. The Eastern market shows a marked falling off, prices having continued to decline, reaching as low as £363. The shipping problem is difficult.

The situation in U.S.A. is still very serious, and although it is rumoured that the Government will commandeer all Tin and control the prices and distribution to consumers, it is difficult to see how this can be done, seeing that U.S. stocks are very low and buyers have been prepared to pay any price in order to obtain supplies.

Comparative Prices.

June 3rd	£349	0	0 per ton.
May 30th	£353	0	0 per ton.
May 22nd	£360	0	0 per ton.
May 9th	£380	0	0 per ton.

LEAD.—The position of this market is now fairly satisfactory, supplies being well maintained.

STEEL.—Sellers are now seeking buyers, as in pre-war days. It appears that the two main factors responsible for this change are the cessation of supplies to Russia and the new extensions at the mills and corresponding increase in output.

It is very difficult to say whether this easiness will continue or whether it is merely a temporary inflation of stocks. In any case it is very welcome, and if advantage is taken should enable the Air Ministry to obtain large supplies of aircraft steels in anticipation of future requirements. Official prices remain unchanged. The average basis price of Cast Steel is now 98s. per cwt.

TIMBER.—The question of supplies is still the one absorbing theme, and a solution to this problem does not appear to have been discovered by the authorities. Probably they are pinning their faith on Spruce substitutes.

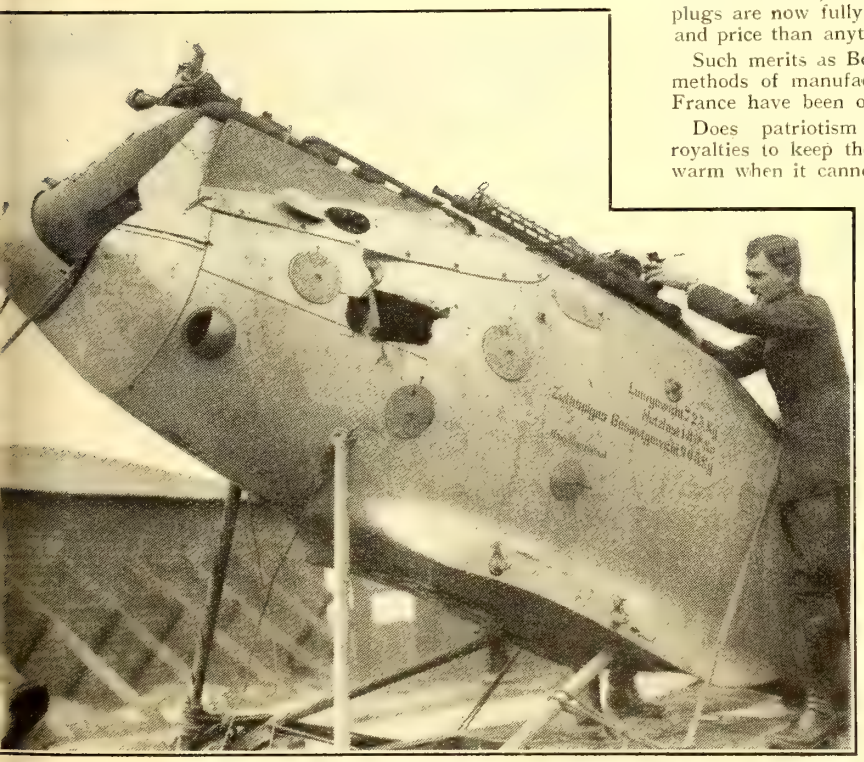
Although it was rumoured about a fortnight ago that the Air Ministry contemplated taking over the control of Plywood no official notification of this appears to have been received.

Mahogany supplies are fairly well maintained.

Prices remain unchanged.

FABRIC.—There is nothing of importance to report. Supplies are fairly easy to obtain through official channels.

It is rumoured that the use of frayed fabric will be discontinued shortly in favour of strips cut from fabric clippings.



The Nose of the Fuselage of a Pfalz biplane.

A TRADE MATTER.

The following letter has been received:—

Sir,—We observe in the newspapers an account of the acquisition by Messrs. Bluemel Bros., Ltd., of a licence to manufacture sparking plugs under the Bosch Patent.

We notice with particular interest that during the progress of the case the statement was made that English manufacturers of motors needed, called for, and were unable to obtain Bosch sparking plugs. The inference was that there was some peculiar merit possessed by the German patent which sets this make of plug above and apart from other makes. This is entirely inaccurate and misleading.

There is not a single manufacturer in this country at the moment fitting Bosch plugs, and although we are intimately associated with the whole trade we have yet to hear of a manufacturer who wishes to do so on the grounds that they would fulfil any purpose which English-made plugs are unable to do with equal satisfaction to the user. Bosch plugs represent Germany's best effort in plug-making; so does the Bosch magneto among magnetos. Whatever may have been the case before the war, British magnetos and the best British sparking plugs are now fully equal to and probably better both in quality and price than anything Germany has ever produced.

Such merits as Bosch plugs possess are the outcome of careful methods of manufacture; plugs of similar construction made in France have been on the market for years.

Does patriotism prompt that Englishmen should pay royalties to keep the name and fame of a German-owned patent warm when it cannot be demonstrated that it has a single merit unpossessed by British-made plugs?

(Signed)

The Sphinx Manufacturing Co.

AVRO LORE.

The June number of the "Joystick" is to hand and a very ambitious production it is. One notes it is No. 4 of the third volume and it gets right away from the conventional line of house-organs by devoting four pages to an exposition of the Education Bill, in the course of which four statistical items show why a Bill is wanted and four items explain what the Bill proposes. The question is most admirably worked out by Mr. J. S. Morgan, one of the Welfare Supervisors. Messrs. A. V. Roe and Co. are really a most considerate and democratic firm; their latest scheme is that of a Boy Welfare Department supervised by Mr. Morgan and Mr. W. T. Wilson, and in the course of another article, showing considerable literary skill, they explain how the directorate has empowered them to provide all that is necessary for the moral, mental, physical and social training of their youths.

Firth's Aircraft Steels.

Mark "A" Non-Magnetic
Bullet-proof Plates
For Armouring Aircraft.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

**Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.**

**Telephone No.—
KENSINGTON 6520 (4 lines).**

**Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.**

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AIRCRAFT FINANCE

CURRENT TOPICS.

THE CONFIDENCE OF THE MARKET.

One would scarcely imagine from the calm and decorous behaviour of the financial world that the great German offensive is now in full swing. True, the multitude of rules and regulations under which business is now conducted are all calculated to check what in normal times was called the functional manifestation of the financial structure. But the bald fact remains that in the Stock Exchange there is a greater disposition to buy securities than to sell, which clearly evidences a feeling of confidence in the ultimate issue of the struggle.

WAR MONEY COMING IN BETTER

Indeed, one of the results of the German onslaught has been to spur people on to purchase more War Bonds. This is a happy development. Only a week or two ago the question of obtaining more money for financing the war became very serious, if not really critical. Now, if the quantity of money rolling in is not so ample as the authorities need, it is increasing satisfactorily, and with the banks up and down the country exerting a little more moral pressure on their clients, the remedial measures contemplated may be temporarily postponed.

VICKERS AND AEROPLANES.

Enquiries continue to be received as to the desirability of investing money in aircraft firms with a view to the future.

Take the case of Vickers; it is a gigantic undertaking which has taken up the manufacture of aeroplanes as a side line just as it has from time to time turned its activity and genius to the construction of many other things which are absolutely foreign to the ordinary business of armament specialists. Every schoolboy has discovered by now that aerial navigation and germane industries have boundless possibilities, commercially, industrially and militarily. Vickers are sure to make the most of these possibilities because they possess the capital as well as the facilities, and also the political power.

WHAT THE SHARES OFFER.

Their £1 shares are priced in the market at about 43s.., so that on the dividend of 12½ per cent. they offer the purchaser about 6 per cent. on his money. At first blush this seems a poor return, but it is very important to note that the company pays the income tax on the dividend, therefore the yield is equal to a return of 7½ per cent. subject to tax. It should be mentioned, however, that the Board intends to modify this practice of paying income tax for the shareholders. As compensation it will increase the dividend and distribute it subject to the shareholders paying the tax. Conceivably the net return to the shareholders may be a trifle more than at present.

SPECULATIVE POSSIBILITIES.

To some people the great attraction of Vickers' shares rests, not in the present dividend, but in their speculative possibilities. Since 1913 the dividend has been a uniform 12½ per cent. annually, yet it must be patent to everyone that since the outbreak of the war the company has made millions more profit each half year. How much the profits have really grown no one knows; the accounts have not been published because of the inability to fix up terms, etc., with the Government. But some day and somehow these accumulated profits must be dealt with. Probably excuses will be found for keeping a good portion of them in the business for future development, but surely there must be a substantial balance available for the ordinary shares, to be divisible either as larger dividend or as bonuses.

ROLLS-ROYCE.

The Rolls-Royce Company comes into a different category from Vickers; it is younger, and is, or was, essentially a motor-car constructional concern which has gained fame therefor. Now it seems to be concentrating its energies mostly on aeroplanes and also engines with great success. Only a month or two ago it provided a very pleasant surprise for its shareholders by capitalising its reserve fund and thus giving them as a bonus one new share in respect of each one held in addition to the 10 per cent. dividend. Here again the company is behind-hand in presenting its accounts owing to the inability to settle outstanding differences with the Government.

BIGGER PROFITS ESTIMATED.

However, the profits are said to be swelling visibly; it is estimated that they are over £100,000 per annum, which on the increased capital of £400,000 is equal to at least 25 per cent. For 1916 they were £82,640 against £44,171 in 1915. What they were in the past financial year is not known, but they were certainly greater than in 1916, which makes the estimate of more than £100,000 seem very modest.

PREMISES AND EQUIPMENT.

As the Chairman remarked at the meeting, as a result of the additions carried out for the benefit of the Government when the war is over the company will find itself in the possession of premises and equipment greatly in excess of what it had in 1914, and it will be a question whether or not it can be used to advantage. Naturally the company with the brilliant reputation for its cars and its financial success will surely make the most of this fortunate position.

PRICE OF THE SHARES.

At 37s. 6d. each the £1 shares only offer a little over 5 per cent. on the money invested, but the Stock Exchange is confident not only in bigger dividends in the immediate future, but of possibilities for the company when the war is over. Even if the dividend is increased to 15 per cent. the shares would offer just over 7 per cent. No doubt they possess a greater tincture of speculation than Vickers' shares, but then the two companies differ so much.

There have been few features of interest among aeroplane and kindred shares. Aircraft Manufacturing "B" Preference have been consistently firm and gained the whole of the dividend deducted. Armstrongs have been strong and Beardmore Preference have been bought. There are still many enquiries as to when there is to be a market in Whitehead Aircraft shares.

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

The files of the following new companies are available for inspection at Somerset House.

LEWIS SPEED-UP TOOL AND ENGINEERING WORKS, LTD.—Private company. Registered, May 23rd. Capital, £1,000 in £1 shares. Mechanical, aviation, electrical, marine, hydraulic and motor engineers, metal founders, fitters, smiths, millwrights, tool makers, etc. The first directors are:—J. Lazarus (British), H. Tardy (Swiss) and C. V. Thurdin (Swedish). Qualification: 10 shares. Registered office: 2a, Kelvin Road, Highbury, N.5.

MARSTON LINE, LTD.—Private company. Registered, May 22nd. Capital, £40,000 in £1 shares. To enter into two agreements with E. C. Marston & Co., Ltd., relating to (a) the purchase of the steamship "Wirral," and (b) management, and to carry on the business of shipowners, shipbuilders, etc. Power is especifically taken to include in the business the acquisition, building, maintenance and repair and disposal of aircraft.

HONOURABLE GABRIELLE BORTHWICK'S WORKSHOPS, LTD.—Private Company. Registered June 6th. Capital, £3,000 in £1 shares. To take over the business of an automobile and engineering training school and garage proprietors carried on by the Hon. Gabrielle M. A. Borthwick at 8, Brick Street, London; also to carry on the business of flying school proprietors, repairers of automobiles and aircraft, etc. The subscribers (each with one share) are:—

The Hon. Gabrielle Borthwick, 87, Kinnerton Street, Knightsbridge, S.W., motor dealer.
Edith Ogle, 5, Kent Terrace, Regent's Park, N.W., motor dealer.

Permanent governing director: The Hon. Gabrielle M. A. Borthwick. Instructress: Edith Ogle. Solicitors: Kenneth Brown and Co., Lennox House, Norfolk Street, W.C.

CHELSEA AVIATION CO., LTD.—Private Company. Registered June 3rd. Capital £250,000 in £1 shares. To take over the business of the Wells Aviation Co., Ltd., and to enter into an agreement with S. J. Waring. The subscribers (each with one share) are:—

J. Ritson, 83, Lonsdale Road, Barnes, S.W.13, chartered secretary.
G. Barclay, 3, Chandos Avenue, Oakleigh Park, N.20, C.A.

The first directors are to be appointed by the subscribers. Solicitors: Paines and Co., 14, St. Helens Place, E.C.

WALKER, MATHESON AND CO., LTD.—Private Company. Registered June 3rd. Capital £1,000 in £1 shares. To take over the business of engineers carried on in London as "Walker, Matheson and Co.," also to carry on the business of aircraft and aeronautical instrument makers, tool makers, lift and hoist makers, ironmongers, electrical, motor power and locomotive engineers, dealers in motor and electrical equipment, etc.

The first directors are:—J. Walker, B. F. Matheson, L. E. Durrant, C. B. Boitel-Gill, each of whom may retain office while holding £100 shares. Qualification: £100. Solicitor A. S. Cooper, 27, Chancery Lane, W.C.



ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

BEARDMORE AERO ENGINES

"A Sound Engineering Job."

THE BEARDMORE
AERO ENGINE Ltd.,
London Showrooms and Depot:
112, Great Portland Street,
LONDON, W.1.
Telephone: Gerrard 238.

C.D.C.

(*Continued from page* 2158.)

R.A.F.; Lt. J. Hanning, Can. Engrs. and R.A.F.; Lt. H. Kesterton, R. Welsh Fus., attd. R.A.F.; Lt. F. Magoun, R.A.F.

THE MILITARY MEDAL.—2nd Air Mech. A. Cox, R.A.F.; 3rd Air Mech. T. Frankland, R.A.F.

OFFICIAL COMMUNIQUES.

NAVAL.

ADMIRALTY COMMUNIQUÉ.

JUNE 6th.—During the period June 3rd to June 5th inclusive eight bombing raids have been made on the following military objectives:—Zeebrugge, Ostend, Bruges, and Thourout railway junction. Large quantities of heavy bombs were dropped. In the course of aerial fighting two enemy machines were destroyed and three driven down out of control.

One of our machines is missing.

In home waters during the same period, escort duties and anti-submarine patrols have been carried out. Submarines were sighted, attacked, and enemy mines located on several occasions.

A squadron of large seaplanes carried out a long reconnaissance over the North Sea. A large formation of hostile machines was met and engaged, resulting in two enemy machines being shot down.

On the return journey two of our machines were forced to alight close to the Dutch coast, owing to engine trouble, and have been interned. The next-of-kin have been informed.

MILITARY.

G.H.Q. COMMUNIQUÉS.

JUNE 4th, 8.17 p.m.—There was less activity in the air on June 3rd.

Some reconnaissance and photographic work was carried out, and in the course of the following night a total of 18 tons of bombs was dropped by our aeroplanes. The targets chiefly attacked by us were the railway stations of St. Quentin, Douai, and Luxemburg.

Three hostile machines were brought down in air fighting, and one was driven down out of control.

None of our aeroplanes is missing.

JUNE 5th, 8.34 p.m.—The weather was overcast on the British front on June 4th, and aircraft were not active.

One hostile machine was brought down by our aeroplanes, and another driven down out of control. One German balloon was destroyed.

Beside reconnaissance work and artillery co-operation, we dropped during the day and the following night 14 tons of bombs. We lost no machines.

JUNE 6th, 9.35 p.m.—Fine weather on June 5th enabled our airmen to carry out much photographic reconnaissance and artillery work.

Twenty tons of bombs were dropped on different targets, including hostile dumps, railways, billets, Armentières and Roye stations, and the Zeebrugge seaplane base.

In addition, our long-distance day bombing machines heavily attacked the railway station and barracks at Trèves and the Metz-Sablon railway station, and the railways at Karthaus (just south of Trèves), returning without loss

Seven hostile machines and three German observation balloons were shot down during the day by our airmen, and three hostile aeroplanes were driven down out of control.

Four of our machines are missing.

On the night of the 5th-6th inst. 13 tons of bombs were dropped by us on St. Quentin, Busigny, Cambrai, and Armentières stations.

All our machines returned.

On the same night our long-distance bombing machines again attacked the Metz-Sablon station and triangle, and also the railway sidings at Thionville, dropping five tons of bombs with good results, although visibility was indifferent.

On the morning of the 6th inst. the railway station at Coblenz was heavily attacked by us, and good bursts were observed on the railway line.

All machines engaged in these raids returned safely.

JUNE 7th, 9.15 p.m.—Our aviators took advantage of the fine weather on the British front on June 6th to accomplish much useful work in reconnaissance and photography, and, together with our balloons, ranged our guns on many hostile batteries.

In air fighting 14 German machines were destroyed and eight others were driven down out of control. Three German observation balloons were also destroyed by our aviators, and another hostile aeroplane was forced to descend by anti-aircraft fire

During the day we dropped 28 tons of bombs and a further 11 tons in the course of the following night. Amongst the targets attacked were Valenciennes, Le Cateau, Busigny, and St. Quentin railway stations.

We lost one machine during the day and none at night.

JUNE 8th, 8.55 p.m.—In the air a good deal of observation and photographic work was carried out by us on June 7th.

Bombing was active on both sides. We dropped 23 tons of bombs on railway junctions, aerodromes, and dumps beyond the German lines.

Twelve enemy machines were brought down by our aviators, and seven driven down out of control.

We lost three machines.

On the night of June 7th-8th no flying was possible.

JUNE 9th, 9.35 p.m.—Low clouds on the British front interfered with work in the air on June 8th. Little photography or observation was possible, but our aeroplanes constantly attacked the enemy behind his lines with machine-gun fire

Our squadrons, co-operating with the French, heavily bombed Nesle and Fresnoy-les-Roye. In all nine tons of bombs were dropped during the day.

During the following night two tons of bombs were dropped on Don railway statiton and Salome dump (east of La Bassée).

In the course of the 24 hours four hostile machines were brought down by us and two others driven down out of control.

None of our machines is missing.

JUNE 10th, 7.47 p.m.—On the 9th inst. our flying squadrons, co-operating with the French on the Noyon-Montdidier battle front, were at work continually from dawn to dusk.

Bombing aeroplanes impeded the enemy's advance, and harassed his troops and transport with constant machine-gun fire. Strong patrols of scout machines swept the battle area throughout the day, while high-flying aeroplanes protected those below from attack from above.

Amongst targets hit by our aviators were an aerodrome near Roye, where hostile machines on the ground were set on fire; an ammunition dump at Montdidier, which went up in a sheet of flame; gun teams and wagons at Conchy; lorries at Lagny (just south of the Noyon-Roye road) and Hainvillers, and infantry in trenches and on the roads along and behind the whole fighting line.

On the British front there was little enemy activity in the air, but our machines carried out a good deal of artillery observation work, reconnaissances, bombing, and photography, until stopped by rain.

One of our artillery machines forced a German two-seater to land and surrender on the aerodrome to which our machine belonged. In addition to this machine, 14 other German aeroplanes were brought down by us and four others were driven down out of control. A hostile balloon was shot down in flames.

Four of our machines are missing.

WAR OFFICE COMMUNIQUÉS.

JUNE 3rd.—The G.O.C. Italy reports:—

Since my last report the Italians have carried out two highly successful operations at the two extremities of the line, the first in the Tonale Pass, the second at Capo Sile. The situation remains otherwise quiet.

Since May 25th the Royal Air Force has destroyed 14 enemy aeroplane and driven one other down out of control.

One of our machines has failed to return.

JUNE 7th.—The G.O.C. Palestine reports:—

Activity during the past week has in general been confined to the operations of the Air Service. On May 31st, June 3rd, and June 4th, the enemy camps, bivouacs, and aerodrome in the vicinity of Amman (on the Hedjaz railway, 25 miles east of the Jordan at the Ghoraniyeh bridgehead) were heavily bombed by Imperial and Australian squadrons.

THE CASUALTY LIST.

MILITARY.

Reported June 6th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Campbell, Sec. Lt. C. St. G., R.F.C.

CANADIAN FORCE.—WOUNDED.—Stefansson, Lt. B., Man. R., attd. R.A.F.

MISSING.—Bruce, Lt. W., Sask. R., attd. R.A.F.; Hall, Lt. R. McK., Que. R., attd. R.A.F.; Macdonald, Lt. D. A., Can. For. Corps, attd. R.A.F.

Reported June 7th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER IN GERMAN HANDS.—Wedgwood, Sec. Lt. F. C. B., M.G.C., attd. R.F.C.

Reported June 8th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONERS IN GERMAN HANDS.—Birley, Sec. Lt. T. E. H., R.F.C.

Clarke, Sec. Lt. C. H., R.F.C.

Reported June 10th.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Bevan, Capt. F. H. V., R.F.C.

Hawtrey, Sec. Lt. J. J. A., R.F.C.

Poulter, Sec. Lt. W. F., R.F.C.

AUSTRALIAN FORCE.—KILLED.—Taylor, Lt. A. L. D., F.C.

WOUNDED.—Jones, Capt. E. J., F.C.

Malley, Capt. G. F., F.C.

MISSING.—Finnie, Sec. Lt. A., F.C.

Nowland, Lt. G., F.C

CANADIAN FORCE.—DIED.—Marchbank, Lt. O. J., Can. Eng., attd. R.A.F.

MISSING.—Scott, Lt. W. A., Can. For. Corps, attd. R.A.F.

CASUALTIES AMONG N.C.Os. AND MEN OF THE AUST. F.C. THE DATE IS THAT OF THE OFFICIAL LIST.

WOUNDED.

MAY 30th.—Aust. F.C.—Crichton, 537 A. C.

* * *

The following officers, who were prisoners in Germany, have now arrived in England :—

Evans, Lt. H. F., R.H.A., attd. R.F.C.; Harker, Sec. Lt. B., Lan. Fus., R.F.C.; Meggitt, Lt. W. G., M.C., Welsh R., attd. R.F.C.; Wickett, Lt. T. H., W. Ont. R., attd. R.F.C.

AIR FORCE.

Reported June 5th.

KILLED.—Bauchope, Lt. L. C. W., R.A.F.
Brown, Sec. Lt. W. G., R.A.F.
Cohen, Sec. Lt. B., R.A.F.
Hargrave, Sec. Lt. W. G., R.A.F.
Kidd, Sec. Lt. E. J. C., W. Yorks. R., and R.A.F.
Kinnear, Maj. J. L., King's (L'pool R.) and R.A.F.
Knight, Sec. Lt. J. B. C., R.A.F.
Mond, Lt. F. L., R.F.A. and R.A.F.
Morton, Sec. Lt. M. C., R.A.F.
Townson, Sec. Lt. H. J., W. Yorks. R., attd. R.A.F.
Traunweiser, Sec. Lt. G. N., R.A.F.
Trigg, Sec. Lt. H. F. E., R.A.F.
Ward, Sec. Lt. J. G., Lan. Fus. and R.A.F.

DIED OF WOUNDS.—Trubridge, Lt. R. W., R.A.F.

WOUNDED.—Dixie, Sec. Lt. N. C., R.A.F.; Glasson, Lt. G. W. T., R.A.F.; Hooker, Sec. Lt. H. G., Middx. R., attd. R.A.F.; Hopkins, Sec. Lt. J. C., R.A.F.; Jackson, Sec. Lt. H. G., R.A.F.; Joseph, Sec. Lt. M. B., R.A.F.; Macdonald, Sec. Lt. C. C., R.A.F.; Manuel, Capt. J. G., D.S.O., R.A.F.; Matthews, Lt. W. H., R.A.F.; Miller, Lt. D. J. M., R.A.F.; Mills, Sec. Lt. K. C., R.A.F.; Moxey, Sec. Lt. S., R.A.F.; Pole, Sec. Lt. H. I., R.A.F.; Pycroft, Sec. Lt. E. P., R.A.F.; Ralph, Sec. Lt. F. J., R.A.F., Shippam, Sec. Lt. F. A., R.A.F.; Walker, Sec. Lt. R. H., L.N. Lan. R. (T.F.), attd. R.A.F.; Wisnekonitz, Sec. Lt. H., R.A.F.

MISSING.—Boulton, Sec. Lt. F. E., R.A.F.; Cowan, Lt. W. E., R.A.F.; Durrant, Capt. T., R.A.F.; Hollick, Sec. Lt. J., R.A.F.; Nixon, Sec. Lt. L. M., R.A.F.; Sutton, Sec. Lt. M. F., R.A.F.; Williamson, Sec. Lt. J., R.A.F.

Reported June 6th.

KILLED.—Crane, Sec. Lt. M. P., R.A.F.
Dann, Sec. Lt. W. S., The Buffs, attd. R.A.F.
George, Lt. L., A.S.C. and R.A.F.
Helmore, Sec. Lt. S. T. J., R. Fus. and R.A.F.
Hinton, Sec. Lt. A. W., R.A.F.
James, Capt. B., R.A.F.
Johnson, P. F/O. J. M., R.A.F.
Moore, Capt. G. B., M.C., R.A.F.
Thacker-King, Lt. L. R., R.A.F.
Whelan, Lt. C., R.A.F.

DIED OF WOUNDS.—Heyes, Sec. Lt. A. E., R.A.F.
Morgan, Lt. F. J., R. Fus. and R.A.F.
Lane, Sec. Lt. A. G. H., R.A.F.
Rumsby, Lt. R. W., R. Suss. and R.A.F.

WOUNDED.—Ambler, Lt. F., W. Yorks R., attd. R.A.F.; Arnold, Capt. E. S., R.A.F.; Barker, Sec. Lt. H. V., R.A.F.; Bennett, Sec. Lt. H. P., R.A.F.; Gibson, Sec. Lt. W. H., R.A.F.; Lumb, Sec. Lt. H. F., W. Riding R., attd. R.A.F.; MacGregor, Lt. D., K.O. Sco. Bord. and R.A.F.; Ould, Lt. J. V., R.A.F.; McMichael, Lt. W. A., R. Scots, attd. R.A.F.; Norden, Sec. Lt. F. L., R. Scots, attd. R.A.F.; Patterson, Lt. L., M.C., R.A., attd. R.A.F.; Redgate, Capt. W. O., R.A.F.; Stacey, Lt. R. H., Bedf. Yeo. (T.F.) and R.A.F.; Stanfield, Sec. Lt. C. J., R.A.F.; Webster, Sec. Lt. F. W., R.A.F.

MISSING.—Brittorous, Sec. Lt. O. G., R.A.F.; Conron, Lt. H. C. R., R.A.F.; Hunt, Sec. Lt. K. P., R.A.F.; Malcolm, Sec. Lt. A. A., Lancers, attd. R.A.F.; Piper, Sec. Lt. E. H., R.A.F.; Robson, Lt. C. C., R.A.F.; Sellars, Lt. H. W., R.A.F.; Scott-Kerr, Lt. W. F., Loth. and Bord. Hse. and R.A.F.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED.—Cartmell, Lt. G. M., R.A.F.

Reported June 7th.

KILLED.—Burfoot, Sec. Lt. W. M., Dorset R. and R.A.F.
Flower, Lt. C. K., R.A.F.
Graham, Sec. Lt. W. J. K., R.A.F.
Hargreaves, Lt. W. H., Middx. R. and R.A.F.
Lowenstein, Sec. Lt. J. C., R.A.F.
Lupton, Capt. C. R., R.A.F.
Mossman, Sec. Lt. C. F., R.A.F.
Napier, Sec. Lt. J., R.A.F.
Reynolds, Sec. Lt. J. E., R.A.F.
Royds, Sec. Lt. T. A., R.A.F.
Southwell, Sec. Lt. C. R., R.A.F.
Taylor, P./F./O. R. J. W., R.A.F.
Tunbridge, Lt. R. G., R.A.F.

WOUNDED.—Atkinson, Lt. G. M., R.A.F.; Bailey, Lt. A. E. G., A.S.C., attd. R.A.F.; Barry, Sec. Lt. V. G., R.A.F.; Booth, Lt. P. W., R.F.A. (T.F.), attd. R.A.F.; Bradley, Sec. Lt. J. S., R.A.F.; Bryer, Sec. Lt. J. H., R.A.F.; Deakin, Lt. H. A., S. Staff. R., attd. R.A.F.; Gregory, Capt. A. F. W., R.A.F.; Hendrie, Sec. Lt. K. G. P., R.A.F.; Jones, Sec. Lt. L. H., R.A.F.; Mimmack, Sec. Lt. S. C., R.A.F.; Parke, Sec. Lt. W. I., R.A.F.; Philpott, Sec. Lt. J. E., R.A.F.; Roaks, Sec. Lt. W. F., R.A.F.; Roberts, Lt. H. P., Suff. R., attd. R.A.F.; Smith, Capt. H. P., Bord. R. (T.F.) and R.A.F.; Weiner, Sec. Lt. L. de V., R.A.F.

MISSING.—Finnigan, Sec. Lt. J., R.A.F.; Fitton, Sec. Lt. J. C., R.A.F.; Glover, Sec. Lt. C. L,, R.A.F.; Gadpaille, Sec. Lt. L. G. S., R.A.F.; Griffin, Sec. Lt. S., R.A.F.; Leavitt, Sec. Lt. H. J., R.A.F.; Napier, Capt. C. C. D., R.A.F.; Russell, Sec. Lt. D. J., R.A.F.; Wilson, Lt. G., R.A.F.

Reported June 8th.

KILLED.—Fine, Sec. Lt. S., R.A.F.
Fraser, Sec. Lt. R. A., R.A.F.
Hall, Lt. F. V., R.A.F.
Hindley, Lt. A., R.A.F.
Kite, Sec. Lt. A. W., R.A.F.
Nash, Sec. Lt. H. A., R.A.F.
Price, Sec. Lt. C. L., R.A.F.
Rice, Sec. Lt. E. G., R.A.F.
Robinson, Lt. W. H., R.A.F.
Sephton, Sec. Lt. S., R.A.F.
Touche, Sec. Lt. E. P. J., Essex R. and R.A.F.
Wells, Lt. C. D. (M.C.), R.A.F.
Yeoman, Lt. B. F. L., Lond. R. and R.A.F.

DIED OF WOUNDS.—Pashby, Sec. Lt. F. E., R. Berks R., attd. R.A.F.

WOUNDED.—Acton, Sec. Lt. J. H., R.A.F.; Evans, Sec. Lt. J. R., R.A.F.; Evans, Sec. Lt. L. E., R.A.F.; Jones, Sec. Lt. O., R.A.F.; Lathan, Sec. Lt. E. G., R.A.F.; Mais, Sec. Lt. R. C., B.W.I.R. and R.A.F.; Millar, Sec. Lt. A. R. A., S. Lanc. R., attd. R.A.F; Moore, Sec. Lt. D. K., R.A.F.; Mitton, Capt. W., Lincs. R. and R.A.F.; Morton, Maj. R. F. S., R.A.F.; Potter, Sec. Lt. W. D., Gord. Highrs. (T.F.), attd. R.A.F.; Rushton, Sec. Lt. F. W. (M.C.), R.A.F.; Skinner, Sec. Lt. M. R., R.A.F.; White, Sec. Lt. R. S., R.A.F.

MISSING.—Bull, Sec. Lt. F. J., R.A.F.; Cross, Sec. Lt. A. S., R.A.F.; Glentworth, Viscount, Lt. E. W. C. G. de V. P., War. Yeo. (T.F.) and R.A.F.; Harrison, Lt. E., R.E. (T.F.) and R.A.F.; Hillyard, Sec. Lt. V. W. H., R.A.F.; Law, Sec. Lt. C. B., Hrs. and R.A.F.; Nevine, Sec. Lt. F. D., R.A.F.; Sansom, Sec. Lt. R. C., R.A.F.

Reported June 10th.

KILLED.—Hawken, Sec. Lt. G. W., R.A.F.
Hopkins, Lt. H. L., R.A.F.
Howard, Sec. Lt. G. S., R.A.F.
Knoll, Lt. W. J. K., R.A.F.
Langley, Lt. J. B. R., R.A.F.
Laverack, Maj. P. V., R.A.F.
Peters, Lt. A. H., R.A.F.
Scott, Sec. Lt. T. F., R.A.F
Sankey, Sec. Lt. C. U., E. Kent R., attd. R.A.F.
Trendell, Lt. M. H. W., R.A.F.
Walker, Sec. Lt. S., Camb. R. and R.A.F.
Wheeler, Sec. Lt. A. J. P., R.A.F.

DIED OF WOUNDS.—Scott, Sec. Lt. R. J., R.A.F.

WOUNDED.—Bellingham, Sec. Lt. F. P., R.A.F.; Braithwaite, Sec. Lt. N., R.A.F.; Capei, Sec. Lt. C. G., R.A.F.; Clarke, Sec. Lt. J. K., Conn. Rang., attd. R.A.F.; Dix, Lt. R. C. St. J., M.C., Lond. R. (T.F.) and R.A.F.; Hughes, Sec. Lt. P., R.A.F.; Ibbott, Sec. Lt. W. C., R.A.F.; Kerr, L. S. P., R.A.F.; Kidd, Sec. Lt. A. L., R.A.F.; Nickalls, Capt. J. P., R.F.A. and R.A.F.; Paisley, Lt. J. R., R.A. and R.A.F.; Palmer, Sec. Lt. H. S. G., R.A.F.; Reynolds, Lt. C. E., Lond. R. (T.F.) and R.A.F.; Saul, Maj. R. E., R.A.F.; Stock Sec. Lt. E. R., R.A.F.; Susman, Lt. W., D. of Well. R., attd. R.A.F.; Whalley, Sec. Lt. J. A., Lab. Corps and R.A.F.; Wrightson, Sec Lt. T. O., R.A.F.

MISSING.—Harrison, Maj. J. I., R.A.F.; Holman, Sec. Lt. H. G., R.A.F.; King, Lt. W. J., R.A.F.; Penruddocke, Lt. N. F., A.S.C. and R.A.F.; Prideaux, Sec. Lt. E. R., R.A.F.; Proctor, Sec. Lt. H. N. J., R.A.F.; Rushton, Capt. C. G., R.A.F.; Williamson, Sec. Lt. J C., R.A.F.

* * *

CASUALTIES AMONG N.C.Os. AND MEN OF THE R.A.F. THE DATE IS THAT OF THE OFFICIAL LIST.

WOUNDED.

MAY 29th.—Bager 202176 Serjt. W. (Heaton, Newcastle-on-Tyne); Cohen 27385 Cpl. M. C. (Harford Street, London); How 402922 Serjt. F. W. (Hackney, N.E.); Lane 44581 2nd A/M F. H. (Southampton); Poole 67985 2nd A/M S. L. (Malmesbury); Savoy 126523 Act. Cpl. 2nd A/M T. (Mile End, London).

Allen's Steels



For Motor Cars - -
For Aeroplanes - -

Specially Recommended.

The attention of Aeroplane and Motor Car designers and manufacturers is called to the quality of

Allen's

Chrome Vanadium Steel

High tensile type; also in lower tensile types with corresponding increase of toughness.

Write for Catalogue D.
Aeroplane and Motor Steels).
Post Free.

Edgar Allen & Co. Ltd
Sheffield.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE

"CLERGET" PATENT AERO ENGINES.



ENGINEERS, LONDON.

"GWYNNE, LONDON."

PERSONAL NOTICES.

NAVAL.

Deaths.

ARTHUR.—Maj. James Arthur, R.A.F., who was killed in action on June 7th, formerly held the rank of Lt.-Comdr. in the R.N.V.R., with seniority of Dec. 31st, 1917, and had previously served in the Ayrshire Yeomanry. He was only son of the late Thomas Glen Arthur and of Mrs. Arthur, of Carrick House, Ayr, and Djenan-el-Mufti, Algiers. He was born in Oct., 1889, and married in 1912, Eleanor Theresa, second daughter of Mr. Samuel Hynman Montgomerie, of Garnsgate Hall, Lincoln, and Lady Sophia Montgomerie, eldest daughter of the fourteenth Earl of Eglinton and Winton.

LE MESURIER.—Capt. Thomas Frederick Le Mesurier, D.S.C., R.A.F. (late Flt. Comdr., R.N.), who was killed on the Western Front on May 26th, was the eldest son of Mr. and Mrs. Le Mesurier, of 10, Church Lane, Merton Park, and was 21 years of age. He was educated at Rutlish School, Merton, and Hurstpierpont College, and, on leaving the latter in 1914, joined the Royal Naval Division. For the past two years he was flying in France, being chiefly engaged in bombing operations. He was a daring and successful flier, and shortly before he was killed was recommended for the command of a squadron. He received the D.S.C. in May, 1917, for "conspicuously good work as a pilot of bombing machines," and in August of the same year he was awarded a bar for good work in leading his flight in bombing raids. On May 26th, after bombing the German trenches, he was crossing the Belgian lines when his machine was seen to crash to the ground. Capt. Le Mesurier and his observer were both killed. Capt. Le Mesurier took part in close upon 150 bombing raids, and was responsible for bringing down a number of German aviators.

Marriages.

CAVE-BROWNE-CAVE—WRIGHT.—On June 8th, 1918, at St. Peter's, Clapham, Lt.-Col. Thomas Reginald Cave-Browne-Cave, R.A.F. (late Wing Comdr., R.N.), elder son of Sir Thomas Cave-Browne-Cave, C.B., of Burnage, Streatham Common, was married to Marjorie Gwynne, only daughter of Mrs. Wright, of Cautley Avenue, Clapham Common, by the Rev. N. P. Tower.

FOX—CASE.—The marriage arranged between Flt. Comdr. Frederick Middleton Fox, R.N., eldest son of Mr. and Mrs. Samuel Middleton Fox, Fawe Park, Keswick, Cumberland, and Helen, eldest daughter of the late Howard Case and Mrs. Case, Rochester, New York, U.S.A., took place on June 8th at St. Stephen's Church, Edinburgh.

* * *

A Good-Service Pension of £150 a year has been awarded to Capt. Sir Godfrey M. Paine, K.C.B., M.V.O. (Temp. Major-General, R.A.F.), to date April 27th.

* * *

His many friends will be glad to hear that Lieut.-Col. Alec Ogilvie, R.A.F. (late Wing-Commander, R.N.), is making satisfactory progress towards recovery from the injuries which he received in an accident to an aeroplane in which he was a passenger last week. His escape from death was wonderful, and the Air Force is to be congratulated on being spared the services of so valuable an officer.

MILITARY.

Deaths.

BENBOW.—Capt. E. L. Benbow, M.C., attd. R.A.F. (Lt., R.F.A.), who was killed in action on May 30th, was the son of Mr. J. Benbow, of La Mortola, Ventimiglia, Italy. He went to France on Feb. 2nd, 1915, and served with his battery for about 12 months. He afterwards served as observer with the Royal Flying Corps for eight months, then, qualifying as a pilot, did work for which he was decorated with the M.C. by the King at the Investiture in Hyde Park on June 2nd, 1917.

BUTLER.—Sec. Lt. Howard Richmond Henry Butler, Aust. Flying Corps, killed in an accident whilst flying in Ayrshire, on June 2nd, was the only son of Mr. W. R. Butler, architect, of Melbourne, Victoria. He was educated at the Melbourne Grammar School, and, after serving some months in Australia with the Royal Australian Engineers, at Swan Island, he enlisted in the Australian Artillery. He was in camp some time at Maribynong, Victoria, and left Melbourne in May, 1917, with artillery reinforcements. He served in the Australian Artillery until October 4th, 1917, and then joined the Australian Flying Corps, being gazetted second lieutenant on April 8th last. He was completing his training before going out to the front. He was 21 years of age.

CAPPER.—Lt. Harry Kent Capper, London Regiment and R.A.F., who was killed on June 4th as the result of an accident while flying in Lincolnshire, was the eldest son of the late W. Kent Capper, of Putney, and of Mrs. Capper, 1, Emperor's Gate, S.W.7.

DAVEY.—Sec. Lt. Albert Victor Patrick Davey, R.F.A., attd. R.A.F., who was accidentally killed whilst flying abroad on June 2nd, was 22 years of age and son of Mr and Mrs. Davey, of Wyoming, Bexley Heath. Educated at Colfe's Grammar School, Lewisham, he obtained an appointment with the R.M.S. Packet Company. In May, 1915, he enlisted as trooper in the County of London Yeomanry. After service on an Eastern front he returned to England, and secured a commission in the R.F.A. in June, 1917. Transferring to the R.A.F. in Sept. he went out to the front last March.

KEMP.—Sec. Lt. George Hubert Kemp, R.A.F., killed in aerial fighting on June 1st, aged 20, was the second son of Mr. and Mrs. G. Kemp, of Westcombe Park, and was educated at the Roan School, Greenwich. Before joining the forces he was engaged in the Port of London Authority. He received a commission in the Durham L.I. in 1917, and was wounded at Chérisy. He transferred to the R.A.F. in 1918, and had gained his wings. He was shot through the heart in a fight with a number of German aircraft, but his pilot descended within the Allied lines.

MANUEL.—Lt. E. G. Manuel, R.A.F., died on June 8th as the result of a flying accident at Hendon. He was 29 years of age.

George Manuel, writes one of his friends, was a thorough little sportsman. He was one of the old Army, and wore the 1914 Star. His humorously pessimistic outlook on life in general and on the war in particular was a healthy antidote to the unthinking casualness of younger officers, yet he was in reality far from being a pessimist. He believed in the soundness of the nation at heart and, both before and after joining the R.F.C., he did his duty as an officer and a gentleman should. Without being a specialist on any subject there were few subjects on which he was not unusually well informed, and his quick wit and keen sense of humour made him a companion who will be sorely missed by all who knew him.

He was a thoroughly sound pilot and his death occurred in one of those practically unavoidable accidents which will happen to the most skilful. He was taking a machine out of the aerodrome when the engine stopped. As he was turning to land, another machine crossed his path, and in avoiding it he allowed his machine to stall, with the result that it dived from so low a level that he had no room to flatten out before it crashed. He was killed instantly.

MEADWAY.—Lt. Brian Wilton Meadway, Northants Regt. and R.A.F., who was killed while flying in Hertfordshire on June 4th, was the only child of Minnie and the late G. H. Meadway, grandson of John Wilton, of Heathlands, Chadwell Heath, and great-grandson of George Wilton, of H.M.S. "Agamemnon," Trafalgar, 1805. He was 22 years of age.

MILDMAY.—Second Lt. Bouverie Walter St. John Mildmay, R.A.F., whose death in action on April 16th has been officially announced, was only son of the Rev. Arundell St. John Mildmay, of Old Wolverton Vicarage, Bucks, and was the only male representative of his generation of the Mildmays of Hazlegrove. Educated at Stonehouse, Broadstairs, and Winchester, he entered the R.F.C. under a Headmaster's nomination. He had his commission in August, 1917, and from his squadron abroad comes the following: "He was a remarkably daring pilot, and he was trying a very steep dive over the aerodrome when something seemed to break in his machine. He pulled out of the dive with difficulty, but almost immediately afterwards, while turning to land, his machine went out of control and dived again to the ground." Mr. Mildmay was by heredity a Count of the Holy Roman Empire.

MITCHELL.—Lt. Norman Ramsey Mitchell, Royal Scots, attd. R.A.F., who was killed in a flying accident in Kent on June 6th, was the eldest son of the late Norman R. Mitchell and of Mrs. Mitchell, 8, Blackford Avenue, Edinburgh. He was 24 years of age.

MUSGRAVE.—Maj. Herbert Musgrave, D.S.O., R.E., was killed in action on June 3rd. He was the youngest son of the late Sir Anthony Musgrave, G.C.M G., and of Lady Musgrave, of East Grinstead. He was born in May, 1876, and passed through Harrow and Woolwich into the Royal Engineers in March, 1896; he had promotion in March, 1899, was Capt. in March, 1905, and Maj. in Oct., 1914.

Maj. Musgrave, who was a graduate of the Staff College, was employed with the South African Constabulary from June, 1901, to Sept., 1904, and was D.A.A. and Q.M.G., at Malta from Aug., 1908, to Aug., 1912. In the following year he entered the Royal Flying Corps, and in 1914 for a period he was Deputy Assistant Director of Military Aeronautics at the War Office, and also controlled the supply of matériel.

In Feb. this year he was appointed a General Staff Officer (second grade). He had received the D.S.O. during the war. For service in South Africa (1899-1902) he had two mentions in despatches and was awarded the Queen's and the King's medals with seven bars. Maj. Musgrave, who had been wounded early in the war, married in 1915 Georgeanna, only daughter of Mr. Mark Hopkins.

PAICE.—Stanley Cooll Paice, Canadian Contingent, attd. R.A.F., was killed in a flying accident at Upavon, Wilts, on June 4th. He was 30 years of age.

LEWIS & TYLOR Ltd.

Cardiff and

51, Gracechurch Street, London, E.C.

PATENT "GRIPOLY" BELTING

STRETCHLESS, HEAT AND WATER-PROOF

FOR ALL TYPES OF MACHINERY.

BANDS AND WEBBING FOR **AIRCRAFT** LEATHER BALATA AND COTTON BELTING.



Kaiser (*loq.*): "How is it at such a height on so cold a morning the lubricants do not freeze?"
Gen. Hoppner: "The British have discovered the secret which we have been seeking for months."
Vide "Daily Mail," see above.

A BRITISH FIRM BEATS THE GERMANS

THE SECRET

THE HANDLEY-PAGE.

After the two royalties had descended from the machine it was loaded with dummy bombs in preparation for a flight. The now famous German flying officer Richthofen took the seat which the Kaiser had vacated, and two other officers also boarded the plane. With a terrific roar the two engines were started, and like a bird the aeroplane rose in the air. It climbed rapidly to about 10,000ft., and the Kaiser turned to General Höppner, saying:

"How is it that, at such a height and on so cold a morning, the lubricants do not freeze?"

"The British have discovered the secret which we have been seeking for months," replied the general. "Our great difficulty is now surmounted. It [illegible]

Extract from "Life in Essen." Eye-witness's Account. —"Daily Mail," April 8, 1918.

WAKEFIELD Castrol 'R' MOTOR OIL

Racing)

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

was the lubricant used

Castrol "R" possesses the lowest cold test of any known Aero Engine Oil.

C. C. WAKEFIELD & CO., LTD.

WAKEFIELD HOUSE, CHEAPSIDE, LONDON, E.C.2

C.D.C.

PLUMPTRE.—Lt. Leslie Grantham Heigham Plumptre, Beds. Regt., attd. R.A.F., who was the adopted son of Mrs. Henry Heigham, 43, Redcliffe Square, was injured in accident, and died two days later, on June 4th, at casualty clearing station. He was 20 years of age.

RADER.—Philip D. Rader, an American aviator, who served with the R.F.C. early in the war, was killed in a practice flight at Buffalo on June 10th. A student flying with him was also killed.

SALMON-BACKHOUSE.—Lt. St. John Salmon-Backhouse, R.A.F., who was killed in aerial combat on April 3rd, aged 28, was the second son of the late R. Salmon-Backhouse, of Leeds, and Mrs. Salmon Backhouse. He was educated at Lynams and King's College School, Wimbledon, and then entered an engineering workshop, where he trained for four years. He went out to Argentina in 1909, and was employed on the Central Argentine Railway at Rosario. After three years he obtained an appointment as draughtsman in Liebig Meat Extract Company Fabrica, Colon, Entre Rios, where he remained until the war broke out. He returned to England, and enlisted in the 1st Sportsman's Battalion, obtained his commission, and transferred to the East Lancashire Regt., and was sent to the front in July, 1916. In the following year he joined the R.F.C., went to Cairo, and obtained his "wings," and returned to Salonika as pilot.

SMITH GRANT.—Capt. John Gordon Smith Cheetham Hill Smith Grant, Royal Scots, attd. R.A.F., who is reported to have died of bomb wounds on May 30th in a stationary hospital in France, was the eldest son of the late Colonel George Smith Grant, Minmore, Glenlivet. He was 25 years of age.

VAN RYNEVELD.—Lt. John P. van Ryneveld, R.F.C., whose death was announced last week, was the younger son of Mr. and Mrs. D. J. van Ryneveld, of Theunissen, Orange Free State, and brother of Lt.-Col. H. A. van Ryneveld, R.A.F. He was 23 years of age.

WILBERFORCE.—Capt. William Robert Sargent Wilberforce, M.C., K.R.R.C. and R.A.F., whose death was announced last week, was educated at Winchester, where he gained many athletic distinctions, winning the school steeplechase, and being a member of Commoner VI. and the Association football team. On the outbreak of war he was given a commission in the 7th K.R.R.C., and served with the battalion in Flanders in 1915. On the recommendation of the Commander-in-Chief, B.E.F., he was granted a Regular commission in the K.R.R.C. in 1916, and later joined the R.F.C. Shortly after obtaining his pilot's certificate he proceeded to Egypt, and served continuously in Egypt and Palestine for 12 months, being present at the first battle of Gaza. In 1917 he returned to England, after suffering from fever in Palestine, and was employed as instructor and flight commander up to the time of his death.

ENGAGEMENTS.

DEAN—McNEILL.—A marriage has been arranged, and will shortly take place, between Maj. H. Gordon Dean, York and Lancs. Regt. attd. R.A.F., and Helen McNeill, daughter of the Rev. John McNeill, of England and America.

HILL-REID—CARTER.—The engagement is announced of Lt. William Scott Hill-Reid, Devon Regt., attd. R.A.F., elder son of Mr. and Mrs. William Hill-Reid, of Bexhill-on-Sea, and grandson of the late Rev. William Reid, D.D., of Edinburgh, to Edith Angela, second daughter of Mr. and Mrs. Eric M. Carter, of Edgbaston, Birmingham, and granddaughter of the late Furneaux Jordan, F.R.C.S., of Birmingham.

JACKSON-TAYLOR—WEBSTER.—The marriage of Capt. P. S. Jackson-Taylor, Hereford Regt. and R.A.F., and Joyce, daughter of Mrs. Webster, of 20, Rugby Mansions, W., will take place at 2.30. There will be no reception, but friends will be welcome at the church.

ROE—STOPES.—A marriage has been arranged and will take place on June 19th at 2.30 p.m. at St. Margaret's Church, Westminster, between Humphrey Verdon Roe, Lieut. R.A.F. (late Lt., Manchester Regt.), and Marie Carmichael Stopes, D.Sc. The Right Rev. the Lord Bishop of Birmingham will officiate.

SUTTON—O'CONNOR.—An engagement is announced between Capt. G. E. F. Sutton, M.C., R.A.F. and Enid Mary Kathleen, elder daughter of Mr. and Mrs. M. B. O'Connor, of Ballygunge, Calcutta, and of Ballygunge, St. George's Hill, Weybridge.

* * *

The Gillingham Town Council have decided to confer the freedom of the borough upon Capt. James Byford McCudden, V.C., D.S.O., M.C., M.M., R.A.F., who is a native of the town.

* * *

A Memorial Service for Lt. Kenneth Chester Herron, Yeomanry, attd. R.A.F., was held at the Church of St. Martin-in-the-Fields, on June 5th.

AIR FORCE.

DEATHS.

ALLOWAY.—Lt. Cecil William Alloway, R.A.F., who was killed while flying at Newmarket on May 27th, was the eldest son of the late William Alloway, and Mary Alloway, of Molesworth, Huntingdonshire. He was 28 years of age.

ASPINALL.—Capt. John Vincent Aspinall, R.A.F., who was killed in action on May 15th, was the son of Mr. H. Aspinall, of London.

BANKS.—A verdict of accidental death was returned at an inquest in London on June 7th on Sec. Lt. Fredk. Banks, R.A.F., aged 21, of Milton Road, Cambridge. It was stated that when flying in Middlesex Mr. Banks proceeded to descend with his engine off. Suddenly he switched it on again, and attempted to turn, when the machine nose-dived to the earth, Mr. Banks receiving injuries that resulted in his death. This was his first flight alone. Officers of the R.A.F. gave evidence as to the capability he had shown in training.

CAPPER, LEWIS and STEINBERG.—A report was received on June 5th by the South-Lincolnshire Coroner that three aviators, Lt. Henry Kent Capper, R.A.F., aged 19, Sec. Lt. John Aikin Carleton Lewis, R.A.F., aged 20, and Actg. Serjt. John Steinberg, R.A.F., aged 20, were killed while flying during the previous night. Two aeroplanes came into collision and crashed to the ground from a height of about 400 ft.

FINLAY.—Sec. Lt. Kenneth Neil Finlay, R.A.F., who was accidentally killed whilst flying at Narborough on June 3rd, was the elder son of the late George Neil and Mrs. Finlay, of Ye Olde House, Long Melford, Suffolk. He was 18 years of age.

HEADLAM.—Lt. John Headlam, R.A.F., who was killed in action on May 30th, was the eldest son of Mr. and Mrs. W. A. Headlam, Stakesby Road, Whitby, Yorks. He was 19 years of age, and was serving as a scout pilot.

MACARTNEY-FILGATE.—Sec. Lt. Desmond Maurice Macartney-Filgate, R.A.F., who died on May 30th from injuries received in a flying accident, was the third son of the late Charles Macartney-Filgate, and grandson of the late Townley Macartney-Filgate, of Lowtherstone, Balbriggan. He was 18 years of age.

MACMASTER.—Capt. Frank H. Macmaster, R.A.F., who was accidentally killed on May 31st whilst flying in Kent, was the second son of Mr. F. H. D. Macmaster, of Buenos Ayres, and Mrs. Macmaster, of 58, Worple Road, Wimbledon.

STEVENS.—Lt. R. H. B. Stevens, R.A.F., who was killed in action on May 30th, was the elder son of Mr. H. M. Stevens, the Borough Accountant, Brighton, and Annie E. Stevens, of Droveway Corner, Dyke Road, Preston Rural, Sussex. He was 19 years of age, and was educated at the Brighton Grammar School.

STUART.—Capt. Peter Dudley Stuart, R.A.F., Croix de Guerre, who was killed on June 1st whilst flying in Lincolnshire, was the younger son of Mrs. E. K. Stuart and the late Dr. Peter Stuart, of Drummoyne, Blundellsands, grandson of the late Peter Stuart, of Elm House, Seaforth, and of the late Henry Simpson, of Nottingham. He was 24 years of age.

ENGAGEMENT.

WHITEHEAD—BINDA.—The engagement is announced between Maj. Ralph Whitehead, R.A.F., eldest son of the late Arthur Whitehead, of Brindle Lodge, Hoghton, Lancashire, and Fanny, only daughter of Cav. Carlos Binda and Signora Binda, of Milan, Italy.

MARRIAGES.

CARPENTER—DYSON.—On Thursday, June 6th, at St. Matthew's Church, Bootle, Lt. Sydney David, R.A.F., only son of Mr. and Mrs. D. J. Carpenter, of Waverley Park, London, was married by special licence to Nellie, younger daughter of Mr. and Mrs. W. Dyson, of Bootle, Liverpool.

COOK—DISNEY.—On June 6th, at St. Mary's Church, Weymouth, Capt. Charles Cook, R.A.F., was married to Eveline, only daughter of Norton Disney.

BIRTHS.

MOLLOY.—On May 28th, at 9, Beaconsfield Terrace, Hythe, Kent, the wife (*née* Noos) of W. Ford Molloy, M.A., LL.B., Serjt.-Maj., R.A.F.—a daughter (Sheila).

DREYDEL.—On May 28th, at Glendale, Hale, Cheshire, Joyce (*née* Wauchope), the wife of Capt. A. J. Dreydel, R.A.F.—a daughter.

FOREIGN COMMUNIQUES.

FRANCE.

June 4th.—During the day of the 3rd our bombarding squadrons, while forcing their way into the enemy's lines, shot down two enemy aeroplanes. Three other aeroplanes and two captive balloons were shot down by our chasing squadrons.

During the same day 21 tons of projectiles were dropped on troops on the march, artillery columns, and supply transports. During the night of June 3rd-4th 28 tons were dropped on the same objectives.

Our observation posts having signalled the approach of enemy aviators on Paris a warning was given at 10.54 p.m., and the



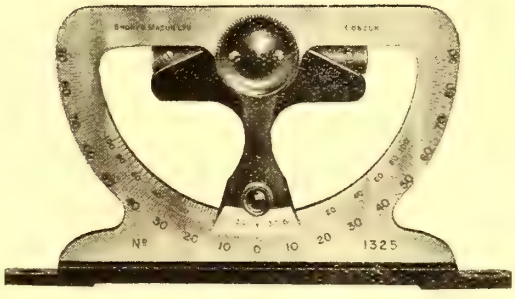
HEIGHT MEASURING

ANEROID ALTIMETERS

(Illustration is Half Actual Size.)

:: FOR EVERY TYPE OF ::

AIRCRAFT



"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES.
— TO CLOSE LIMITS. —

(Illustration is Half Actual Size.)

Manufactured by

SHORT & MASON, Ltd.,

WALTHAMSTOW, LONDON, E.17.

Telegrams: "ANEROID, PHONE, LONDON." Telephone: WALTHAMSTOW 180.

HIGH GRADE

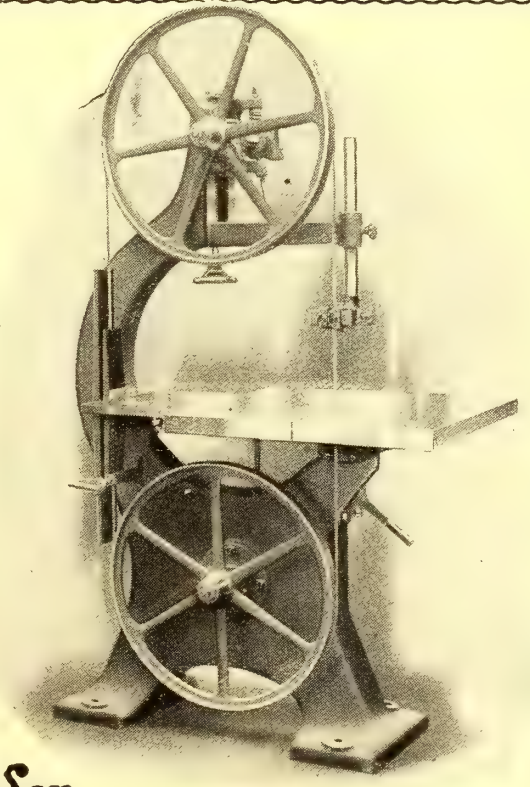
26in. Band Sawing Machine For Aircraft Manufacture

With Canting Table and Locking Device.

A Handy Saw for Small Joinery Work.

TYPE MN.

WRITE FOR PARTICULARS.



Thos. Robinson & Son LIMITED

ROCHDALE

"All clear" was sounded at 11.25 p.m. There is nothing to report.

JUNE 5th.—Our Flying Service continued to show great activity in the whole fighting zone. On June 4th during a double expedition by day in the valley of the Saviere our bombing squadrons dropped over 17 tons of projectiles on concentrations of enemy troops, which were completely dispersed.

During the night of June 4th-5th nearly 14 tons of explosives were further dropped on the stations of Fismes, Fere-en-Tardenois, Roye, and Bohain. Four enemy aeroplanes were brought down, and two captive balloons set on fire.

An enemy machine of giant type with four motors was also brought down during the night of June 1st and 2nd in the region of Nanteuil le Haudoin. Its crew of eight men were made prisoners.

ARMY OF THE ORIENT.—Allied aviators have bombarded encampments east of Seres and north of Huma. An enemy machine was forced to descend, damaged, north-west of Gnevgeli.

JUNE 6th.—Yesterday 19 enemy aeroplanes were brought down or forced to land disabled. A captive German balloon was set on fire.

The same day and during the following night 25 tons of explosives were dropped by our bombing squadrons on cantonments, depots, stations, and convoys in the enemy zone. A great conflagration, followed by explosions, was observed in the station of Fère-en-Tardenois.

JUNE 7th.—During the day of June 6th our pilots shot down, or put out of action, 13 German aeroplanes, and set fire to four captive balloons.

Our bombing machines carried out a number of expeditions against the region of Roye, St. Quentin, Soissons, etc. Twenty-seven tons of explosives were dropped, and a number of fires could be observed in the places bombed.

JUNE 10th.—During the day of June 9th our chasing squadrons destroyed, or put out of action, 11 enemy aeroplanes.

Our bombing aeroplanes, which were able to intervene at once in the battle, attacked unceasingly the enemy's troops massed behind the front of attack.

During the day of the 9th and the night following, in spite of the bad weather, 18 tons of projectiles were dropped on points of assembly, convoys, and railway stations, especially Roye railway station, where a great fire, followed by an explosion, was observed.

During the month of May, 28 German aeroplanes were shot down by anti-aircraft fire, three of them by night. In addition, 20 other machines, driven out of control by our fire, were compelled to break off their mission.

ARMY OF THE ORIENT.—In the course of Sunday's air fighting one enemy aeroplane was brought down in its own lines.

GERMANY.

JUNE 5th.—Lt. Loewenhardt achieved his 26th aerial victory.

JUNE 6th.—During the last two days 46 enemy aeroplanes and four captive balloons have been brought down. The Richthofen chasing squadrons shot down 15 enemy aeroplanes yesterday.

Capt. Berthold and Lt. Meckhoff obtained their 31st, Lt. Loewenhardt his 27th, Lt. Udet his 26th, and Lt. Kirstein his 21st and 22nd victory in the air.

JUNE 9th.—Lt. Kroll gained his 24th and 25th, and Serjt.-Maj. Rumey his 23rd aerial victories.

JUNE 10th.—Thirty-seven aeroplanes and six captive balloons were shot down yesterday.

Lt. Kroll obtained his 27th and 28th victories, Lt. Udet his 27th, and Lt. Kirstein his 23rd victory, in the air.

AUSTRIA.

JUNE 10th.—One of our bombing squadrons obtained numerous hits in an attack on the Italian aerodromes of Treviso and Montebelluna (both in the Venetian plain).

ITALY.

JUNE 3rd.—In the morning of June 2nd our seaplanes, despite the enemy's intense anti-aircraft fire, dropped bombs with visibly good results on the military works at Lagosta (an island on the coast of Dalmatia). All our machines except one returned to their base.

JUNE 5th.—Accurate shooting by our batteries brought down a captive balloon in flames on the left bank of the Piave.

On the evening of the 3rd inst. four enemy aeroplanes were brought down.

JUNE 7th.—Aeroplanes and airships bombarded with more than five tons of bombs enemy aviation camps in the Venetian Plain, the railway station of Mezocorona (north of Trent), and columns on the march on the Quero-Fenere road (Upper Piave).

JUNE 8th.—The enemy's aviation camp between the Piave and the Livenza and the railway station of Caldonazzo (Brenta Valley, 12 miles south-east of Trent), surprised while in full activity, were effectively bombarded by our aeroplanes and airships. In fighting 10 enemy machines were brought down.

JUNE 9th.—Our airships and aeroplanes bombarded railway stations, aviation camps, and enemy hutments, and attacked troops in movement with machine-gun fire. At Mattarello station (about five miles south of Trent) the explosion of a large ammunition dump was observed. During the air fighting in t day five enemy machines were brought down.

JUNE 10th.—Our aeroplanes dropped four tons of bombs enemy depôts and communication junctions. Five enemy aer planes were brought down during air fighting.

BELGIUM.

JUNE 5th.—Sous-Lieut.-Av. Coppens shot down a German ballo south of Zarren. This is the fifth balloon set on fire by th aviator in the last three weeks.

JUNE 7th.—To-night German aeroplanes dropped bombs some of our cantonments. One of the enemy machines was sh down in the region of Adinkerke by our anti-aircraft guns a its occupants made prisoners.

JUNE 9th.—Sous-Lieut.-Av. Coppens brought down his six balloon, thus bringing the number of his aerial victories up seven in a month.

THE WAR IN REVIEW.

A French Affair.

M. Painlevé has been appointed President of the Fren Parliamentary Aviation Group, in succession to the l M. Millevoye.

M. Painlevé Opinions.

The correspondent of the "Daily Chronicle" writes fr Paris on May 21st as follows:—

M. Painlevé, formerly Premier and War Minister, who h just accepted presidency of the aviation group in the Chamber Deputies, contributes to the "Petit Parisien" an interest programme of the aerial war force. He points out that it essential to blind the enemy's artillery, that is, to destroy German aeroplanes employed on observation work.

He recommends that the Entente aviators should, by th number and boldness, make the air a prohibited area for Germ aviators, and that by incessant bombardments our aerial fl should day and night harry the enemy's convoys, his commu cation and revictualling lines, his cantonments, as well as firing line. This has already been done on a limited scale. must now be done on a vast scale.

He appeals to America to send us thousands and thousands bombarding aviators. A thorough understanding between Allied aeroplane makers is essential. They must communicate one another their experiments and their factory secrets, and th ensure the creation of the aerial army of civilisation.

THE ROYAL ALBERT HALL,

Saturday, June 15th.

— at 3 30 p.m. —

A Mass Meeting

WILL BE HELD TO PASS A RESOLUTION demanding

That All Germans be Denaturalised and Interned.

That All Aliens be Registered.

And that the British Empire be Preserved for the British People

N. Pemberton Billing, M.P.

Will take the Chair.

Organ Recital 2.30 to 3 30 p.m.

Tickets for Reserved Seats can be obtained by sending a stamped addressed envelope, "THE VIGILANTES SOCIETY," 5. St. James' Place, S.W.1.

COOLNESS MEANS POWER

In any high efficiency engine, such as that of an aeroplane, the cooler it can be kept in every part the higher the efficiency at which it can be run



which accounts for the success of

THE

LODGE

AERO PLUG

The Coolest of all Plugs made.

THE LODGE SPARKING PLUG CO., LTD., RUGBY.

Heating & Ventilation Installations for Factories Dope Rooms and all requirements

ROSSER & RUSSELL Ltd
HEATING ENGINEERS
Manchester House 37 Duke St, Oxford St W1
and Cabinet Chambers Basinghall St. Leeds

formerly at
22 Charing Cross
S.W.

Telephone
Mayfair 5210

Telegrams
Lesorus Hammer London

An Unfounded Rumour.

A statement that Mr. Clifford B. Prodger has been killed, or seriously injured, is in circulation. One takes pleasure in contradicting this rumour, which is entirely without foundation, and in assuring those concerned that Mr. Prodger was in the best of health at the time of writing on June 11th.

German Anti-Aircraft Defence.

A Berlin telegram, dated May 23rd, says that the Imperial Chancellor has given the following answer to a question concerning protection against air attacks:—

Perfectly sure methods of preventing air raids do not exist. In the first place comes a good anti-aircraft defence, then the menace of reprisal raids against the enemy capitals. The Army Administration is active in both directions. According to newspaper reports, serious and urgent voices were raised in the French Chamber, and especially in the Municipal Council of Paris, in favour of an agreement among the belligerents, as to the cessation of air attacks against towns outside the zone of operations. This, so far, has not led to definite proposals from the enemy side. Should this happen, military quarters would first be charged with the examination of the proposal.

A German Denial.

A Berlin telegram of May 24th says:—The British Admiralty's report that a German torpedo boat destroyer was sunk by a British aeroplane near Zeebrugge is denied.

The Realities of War.

The correspondent of the "Frankfurter Zeitung," on the Western front, writes as follows in an account of the march of General von Hutier's Army into the Somme area in March:—

That was the advance. But this advance we knew already from 1914. We knew it in the East. But what we do not know in the East is the enemy aviators. With every kilometre farther forward they become more importunate. They are not reconnoitring, they are attacking. They come in whole squadrons; the bombs whine through the air and burst; the machine-guns spray up and down the crowded roads; and the columns are without any cover beyond only the roadside ditch. The plaguey fellows are driven off, but they are soon back again, with new bombs and fresh ammunition. Our chasing squadrons cannot be everywhere at once. And so it goes on day and night. No quiet hour, no sheltering billet, and with the cold March rain on top of it all no dry stitch on one's whole body.

The Point of View.

From the "Daily Express" of May 31st:—

The Cologne "Volkszeitung" condemns with fierce wrath the British Whitsuntide raid on Cologne, but carefully conceals the fact of the German Whitsuntide raid on London!

"It can hardly have been a coincidence that the enemy should just choose the day before the Feast of Pentecost for his attack on a town far removed from the front, the military effects of which, as might have been clearly foreseen, could only be nil.

"The circumstance that Englishmen and Frenchmen contrive to present Whitsun gifts of this nature to citizens engaged in the celebration of one of the greatest and holiest Christian festivals thus bringing death and mourning in their train, proves how little prospect there is of any humanising of the war in the air.

"The child-murderers of Karlsruhe proved true to themselves in hurling their bombs at Whitsuntide among the peaceable population of Cologne."

[The similarity of the journalism of Cologne and of Fleet Street is quaint.—Ed.]

Mutual Recriminations.

The "Daily Telegraph" correspondent at Rotterdam writes on June 1st:—

There are increasing symptoms that the air raids on German towns are having the desired effect on the public, who are displaying growing anger against their own military authorities

Lang Propeller LTD.

Contractors to the Admiralty and War Office.

WEYBRIDGE, SURREY.

SMALL TOOLS FROM STOCK.

CHUCKS, DIE HEADS. VICES.

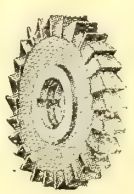
High Speed & Carbon Twist Drills



H.S. Taper End Mills.

MACHINE NUT TAPS.

DRILL CHUCKS



Milling Cutters, Side and Face Slotting Cutters, Slitting Saws.

TAPPING ATTACHMENTS



Hand Reamers

DIES.

MICRO-METERS.



SHELL REAMERS.

Taps, B.A., B.S.F., & Whitworth,

HACK SAWS, HIGH SPEED STEEL, Round & Square.

The SMALL TOOL SUPPLY Co., Ltd.

AVENUE CHAMBERS, SOUTHAMPTON ROW. W.C.1

'Grams—Prosait, West-Cent, London. 'Phone—2655 Museum.

NOTE.—LARGE STOCKS. PROMPT DELIVERIES.

Dope Room Temperature and Air Change

to conform to Home Office requirements.

Covering Room Conditions

to meet official approval.



Sturtevant Heating and Ventilating Apparatus will give the required conditions. Over 70 Aircraft Factories have been equipped with Sturtevant Plant with entirely satisfactory results. We shall be pleased to place the services of our Aircraft Department at your disposal to assist you with your requirements in this direction.

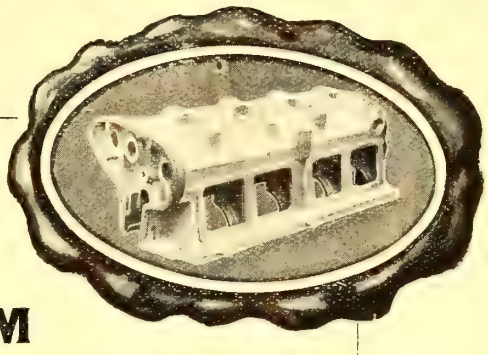
Ask for Catalogue W 1063.

Sturtevant

Engineering Co., Ltd.,

147, Queen Victoria St., London, E.C.4.

Sterling



ALUMINIUM CASTINGS.

1. High Tensile Strength. Thoroughly sound.
2. Uniform in analysis, strength and weight.
3. Highly finished and accurate — machine moulded up to largest sizes.
4. Exceptional daily output per pattern.

AIRCRAFT AND MOTOR ENGINE CYLINDERS, CRANKCASES, PISTONS, Etc.

We also make cylinders and pistons in STERLING IRON; castings in phosphor and 5 ton manganese bronze.

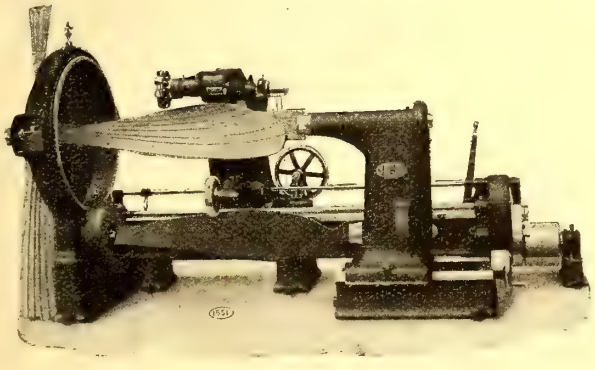
Sterling Metals, Ltd:
Coventry.

WIRE: STERMET COVENTRY
PHONE: COVENTRY 881

Godbolds.

SAGAR

AUTOMATIC PROPELLER SHAPING MACHINE



The Machine illustrated has been specially designed for shaping Airscrews and Aeroplane Propellers with two or four blades from 7 feet to 11 feet 6 ins. diam., with blades up to 13 ins. wide.

Fuller particulars of the above or any other kind of Wood-Working Machinery suitable for Aircraft Factories will be gladly sent on request.

J. Sagar & Co., Ltd., Saw Mill Engineers,

LONDON OFFICE: 60, WATLING STREET, E.C.

At Cologne feeling is very bitter, and the Town Council have called upon the military to answer for the failure of the defences. The army in turn tried to throw the blame on the local authorities, Col. Thomson, representing the general commanding the Air Forces, declaring: "You did not give warning in time to allow civilians to shelter themselves."

Were They Zeppelins?

A message from Copenhagen, dated May 23rd, states that fishermen who have arrived at Esbjerg state that they witnessed a German Zeppelin brought down in the North Sea. They stated that the crew were saved by the men on a British destroyer.

A telegram to the "Copenhagen" states that a Zeppelin was shot down on June 1st, probably by a hostile warship, off Nymind gab, north of Esbjerg. The whole crew are believed to have been drowned.

[It is curious that there is no British Naval communiqué on the subject.—Ed.]

The Fate of Lt. Bongartz.

Lt. Bongartz, one of the German "Aces," has been brought down by a British aviator. He received a bullet which has caused the loss of an eye.

The Death of Major Lufbery.

Reuter's correspondent with the American Army writes on May 19th:—

Major Raoul Lufbery, who formerly belonged to the Lafayette Squadron, but has been a member of the American Air Service for some months, was this morning shot down in flames during an engagement which took place at a height of about 5,000 feet with a German triplane carrying two guns. Major Lufbery remained in his aeroplane until he was some 2,500 feet from the ground and his machine was a roaring furnace, and then he jumped out. His body fell near a farmhouse. The burning machine was found 400 yards away.

About the same time Lt. Douglas Campbell gained his second air victory by shooting down an enemy biplane in flames. It fell inside our lines.

Major Lufbery, who is credited with having brought down 18 German aeroplanes, had been a fighting aviator on the French front for about two years. As far back as December 29th, 1916, he had been the victor in six aerial combats. He came from Chicago, and was one of some 12 citizens of the United States who offered their services as flying men to France and who formed the Lafayette Squadron. Major Lufbery had been decorated with the Military Medal and the Cross of the Legion of Honour for his services.

METAL FITTINGS. HEAVY & LIGHT.

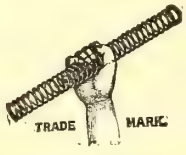
OXY WELDING
BRAZING
ANNEALING

QUALITY
DELIVERIES
PRICES
} RIGHT.

Being ahead with all our deliveries and in a position to treble our output, we can give your requirements immediate attention if we receive your enquiries at once.

WALKER & HUTTON, *ENGINEERS*, SCARBORO.
TEL. 149.

TERRYS SPRINGS



—on Springs.—TERRY experience and organisation is unrivalled, for service and quality.

We have kept in touch with every phase of engineering development—and—we have pioneered the spring world—

We turn out high grade Presswork too.

May we quote for WAR WORK?

(1)

HERBERT TERRY & SONS, LTD.,
The Spring and Presswork Department,
REDDITCH, Eng.

VENUS PENCILS

IT is important to know that you cannot buy a faulty Venus Pencil—no imperfect lead is ever sent out of the factory. The lead of all the 17 degrees is brought to the highest pitch of excellence and encased in selected straight-grained cedar wood. These points make for economy.

17 Grades, 6B (Softest) to 9H (Hardest) Blacklead—also Copying.

OF ALL STATIONERS, STORES, ETC., THROUGHOUT THE WORLD

"VENUS," 173/5, LOWER CLAPTON ROAD, E.5.



J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.
Great Charles Street, Birmingham.

6



E. R. Calthrop's Aerial Patents, Ltd.
Eldon St. House, Eldon Street, London, E.C.2

Telephone (2 lines) — LONDON WALL 3266 & 3267.
Telegraphic Address— "SAVEMALIVO, AVE, LONDON

Where Flying Men are fitted out.

ONE SERVICE



Uniformity of custom and kit; on land, on sea and in the air one organisation only—unity of control centring on one ideal—efficiency. That is the ideal aimed at by the R.A.F. It also summarises the policy of Dunhills; as the R.A.F. have co-ordinated all the efforts and abilities of its two parent services for the better 'strafing' of the Hun so is every idea, every thought and every effort concentrated by the House of Dunhill on the problem of eliminating weather.

The land crab knows nothing of weather inconvenience—it is left to men of the R.A.F., who fight it in its own headquarters, to feel the full fury of its All Highest displeasure.

But Dunhills know and have provided for the worst to the last little detail; and it is just this expert "understanding" knowledge that made them so indispensable to men of the old Air Forces.

The new Force still has the old traditions, the old enemies and now they are one service they still have Dunhills for equipment—the one service that will never fail them.

Call in, if you can, at our well-known "base" in Conduit Street—a few paces from Regent Street—and inspect the full kit. Or, if London is "out of bounds," drop a line for patterns and full details which will be sent gladly on request.

Dunhills

LIMITED.
2, Conduit Street,
Regent Street, London, W. 1.

The Death of Captain Resnati.

It is reported that Captain Resnati, the Italian military aviator who demonstrated the Capronis in the United States, has been killed in an aeroplane fall.

Camouflage.

Reuter's correspondent with the American Army writes on May 21st:—

According to information obtained from a captured German officer the published monthly figures of German air losses are not accepted by the flying personnel, and are intended for the German public and neutrals. A machine which is shot down within the German lines is not counted as a casualty if even parts of it are salved. [Which appears to be the custom of all belligerents.—Ed.]

A Fine Performance.

A message from New York on May 24th stated that Katherine Stinson, postal flyer, broke the American non-stop record in an attempt to fly from Chicago to New York. Owing to shortage of gasolene she was forced to descend at Binghampton. She flew 783 miles in ten hours.

A Quick Journey.

It is reported that two aviators flew from New York City to Washington D.C., had luncheon in the American capital, and arrived back in New York in time for dinner, the entire journey occupying nine hours.

Flying in South Africa.

The "Daily Express" of June 3rd publishes the following from its Johannesburg correspondent:—

Maj. Miller has returned to Johannesburg after a journey of 800 miles in the air.

It is calculated that 100,000 Swaziland natives saw Maj. Miller in the air, and his flying created a sensation. The natives hid in the bush or scuttled to their kraals.

At Mbabane they waited round the aeroplane all night to see him start in the morning.

"White man," they were heard to say, "can have Swaziland now. Only thing he cannot do is to raise the dead, and that will come in time."

PETROL TANKS
SUMPS, BONNETS
COWLS, &c.

and other
Light Pressed
& Stamped Work
for Aeroplanes.

JOSEPH SANKEY
& SONS, LTD.

Hadley Castle
WELLINGTON
Shropshire



Class 5 Imperial Acetylene Welding Plant.

OXY-ACETYLENE
PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON,
S.W.1.

Telegrams—"Edibrac, Phone, London."
Telephone—Victoria 3540 (3 Lines)

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.



FIRST IN 1880 FOREMOST EVER SINCE

PROMPT DELIVERY AGAINST 'A CERTIFICATE.'

The quicke drying and hardes Ename manufacture

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOOD
Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:
SILICO ENAMEL CO.
NEW CROSS, LONDON, S.E.

"ULSTER" FANS

FOR ALL PURPOSES.

Forced and Induced Draft on Boilers. Fumes Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. **Hot-Water. Steam. "Ulster" Stoves.**

We Guarantee Success. Our 50 years' experience is at your disposal.

MUSGRAVE & CO., Ltd.,
Manufacturing Engineers,
BELFAST, LONDON, MANCHESTER, CARDIFF.

REPETITION WORK,

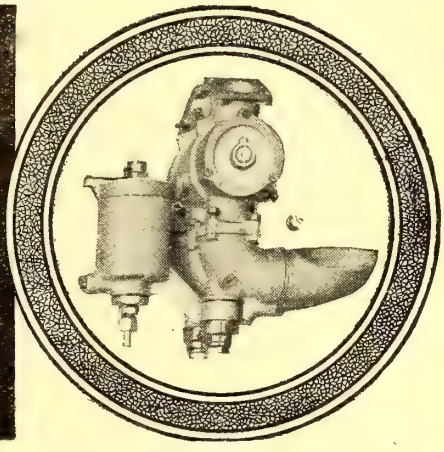
LIGHT PRESSINGS, STAMPINGS & PIERCINGS,

IN ALL METALS.

REYNOLDS BROS., 13-15, Branston St., BIRMINGHAM.

Claudel-Hobson
CARBURETTERS

H. M. HOBSON, LIMITED
29, Vauxhall Bridge Road, London, S.W.1



HEATING AND VENTILATION

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. **Wire: "KINNELL-BOROH-LONDON."**

CHAS. P. KINNELL & Co., Ltd., SOUTHWARK ST., LONDON, S.E.1

THE PARIS POST AND OTHERS.

The "Petit Parisien" writes on June 8th :—

"The French aviators, Heraldy and Lorgnat, yesterday made a new attempt to establish a postal service between Paris and London, which was completely successful. They left Bezons, near Paris, at 1.5 p.m., carrying 300 kilogrammes (about 6 cwt.) of mails, and arrived in London at 3.50 p.m. They left at 4.5 p.m., reaching Bezons at 6.40 p.m. The rapidity of this flight allows one to hope for a regular service, which will assure the receipt of a reply to a letter sent on the same day. The achievement of Heraldy and Lorgnat constitutes a record for the distance covered."

The General Secretary of the Postal Administration made the following statement to a representative of the "Petit Journal" on the subject of aerial posts :—

"We are still quite at the beginning of things. No aerial post service has yet been started. We are studying several services, specially between Paris and Rome and Paris and London, but we have not yet obtained any definite results. It will be necessary to employ a model embodying the characteristics of aeroplane and seaplane, and such a model is not yet altogether ready."

In connection with the above the following statement was also published on June 9th :—

Trials continue daily of aeral flights between town and town, in anticipation of the future aerial postal service.

Since the Paris-London flight and back effected in five hours and a quarter, the aviators, Lemercier and Ducroq, have made a trial flight from Paris to Lyons and back. Leaving Vincennes at 6.40 a.m., they reached Lyons at 11.15 a.m. They left Lyons at 1.20 p.m., and returned to Vincennes at 6.5 p.m.

It was reported on June 9th that an American wireless message states that the air mail service between New York and Boston has been established, the first mail being carried in three hours twenty-two minutes.

THE 39th RAID ON PARIS.

The "Times" correspondent writes from Paris on June 7th :—

The 39th Gotha raid last night resulted in the dropping of one or two bombs, with casualties of one person killed and a few injured. The material damage was slight.

Metal Components

ABSOLUTE accuracy to design, careful finish and entire reliability are the points on which we concentrate in our production of sheet metal components for aircraft.

We make complete sheet metal components, riveted, sweated, brazed or welded, for R.E., F.E., B.E., S.E., De H.

:: :: :: ::

A.I.D. Examiners resident at our works.



Bowden Controls AND Cables FOR Aeroplanes

Suitable for all possible purposes.
Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD.,
TYSELEY, BIRMINGHAM.

Tyseley

B.E.B.

When Fitting-up your Works
AND OFFICES
or Contemplating Alterations
SEND TO

THE CAMDEN CONSTRUCTION CO., LTD.

289, HIGH STREET,
CAMDEN TOWN, N.W.1,

and a Representative will wait on you, submit a scheme and guarantee a time of completion.

Propeller, Engine and other Cases a Speciality.

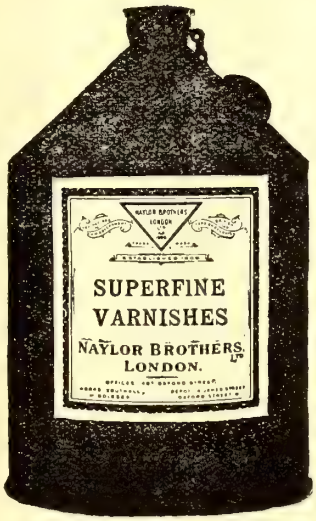
DISTANCE NO OBJECT.

THE USE OF

NAYLOR'S Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work.

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.

Contractors to all Government Departments.

Offices: 407/9, OXFORD ST., LONDON, W. **Also at SOUTHALL.**

Royal Air Force.

WE supply every requisite, in correct details, for the Royal Air Force. We illustrate the new R.A.F. uniform, correct in every detail and perfectly cut.

Khaki Whipcord or Barathea Service Jacket Prices from £5/15/6

Slacks - £2/10/0

Cap, Badge, and Bar Complete - £1/15/0



Robinson & Cleaver LTD.

156-168 REGENT ST., LONDON, W. 1.

Dials

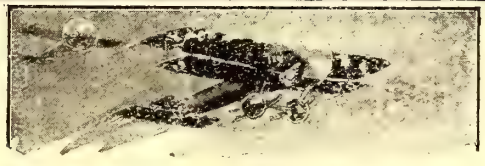
WE give special attention to the production of satisfactory Dials and Instruction Plates in highest grade materials.

We make literally to any specification—in colour, shape, wording or size, any quantity desired, and in any metal besides ivory, ivoroid and bone.

∴ ∴ ∴ ∴

A.I.D. Examiners resident at our works.

British Metal (Kingston) Ltd.
Kingston-on-Thames. *England*



Aeroplane Construction

In aeroplane construction the vital factor is "how many machines can be turned out in a given time." This depends entirely upon the efficiency of the machinery employed. And no machine reaches its highest point of production until its clutches, brakes, etc, are fitted with Ferodo Fabric.

Ferodo Fabrics are the most efficient transmitters of energy. Leather, wood, textile beltings, etc., are out of date for Friction drives and Braking purposes. The moment they become soaked with oil they are useless; Ferodo Fabrics never slip, never seize; are not affected by water, oil or acid, and are absolutely reliable under all conditions.

THE HERBERT FROOD CO. LTD.
CHAPEL-EN-LE-FRITH.

Contractors to the War Office and Admiralty, London General Omnibus Company, and Underground Electric Railways of London and Paris.

Depots at London, Birmingham, Belfast, Bristol, Cardiff, Edinburgh, Glasgow, Liverpool, Manchester & Newcastle.

FERODO
Friction Surfaces.

AEROPLANE

RUBERY, OWEN & Co.

TELEPHONE No. 17. DARLASTON

TELEGRAMS ROOFS. DARLASTON

TRADE MARK

DARLASTON. SOUTH STAFFS

ACCESSORIES

7 Years' Experience.

EX STOCK

We can deliver immediately large quantities of any of the undermentioned Aircraft Fittings :—

Descriptions.	*A.G.S. No.*	*Prices from*
Washers -	161 A.C.D. -	4/6 per gross.
Ferrules -	156C. (14 G.)	2/9 ,,
Thimbles -	136 A.B.C.D.	1/11 ,,
Eyelets & Washers	232 B.C. -	1/3 ,,
Strainers -	4×44 (d.e.) -	1/9 each.
Shackles -	158 F. - -	1/4 ,,
Split Pins -	1/16" × 1/2" -	8½d. per gro s.
,, ,, -	1/16" × 3/4" -	9½d. ,,
Nuts - -	116 A. -	16/6 ,,

Special Machine and Repetition Work carried out in our own Shops.

AEROPLANE GENERAL SUNDRIES, LTD.

Telegrams; Zeppiskout, Holborn, London. Telephone: Holborn 4959. Offices: FULWOOD HOUSE, FULWOOD PLACE, HIGH HOLBORN, W.C

E·K INSULATED WIRES

ELECTRIC

CABLES

No IIIA

SPECIAL MAGNETO CABLE

PASSED THE HIGHEST TEST OF THE A.I.D.

FLEXIBLES SPECIALLY MADE FOR MOTOR CAR AND AERO ENGINES

EST 1901

Regd No 662827

E. KALKER & Co

COVENTRY

THE

Eastbourne Aviation Co. LTD.

ESTABLISHED 1911

THE EASTBOURNE AVIATION Co. LTD.

AEROPLANE CONSTRUCTORS

Contractors to the Admiralty

SBAC THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

TELE{GRAMS: Aircraft / PHONE: 1176} EASTBOURNE

THE CAMDEN CONSTRUCTION CO., LTD.

289, HIGH STREET, CAMDEN TOWN, N.W.1.

CONTRACTORS FOR THE ERECTION OF BUILDINGS

FOR THE AIRCRAFT AND ALLIED TRADES

IN

THE MATERIALS AT PRESENT AVAILABLE WHICH CONDUCE TO SPEED

DESIGNS AND ESTIMATES SUBMITTED PROMPTLY.

THE MIDLAND MOTOR CYLINDER Co. LTD.

SMETHWICK — Nr. BIRMINGHAM

TELEPHONE—289 SMETHWICK

TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET,
BIRMINGHAM.

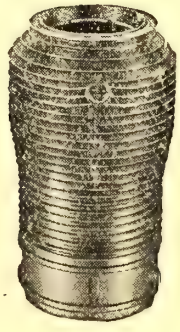


THE

Beverley Engineering Works

Aeroplane Cylinders

Clerget **Le Rhône** **Gnôme**



WILLOW AVENUE, BARNES, LONDON. 'Phone: Putney 178

TIMBER

SILVER SPRUCE
ENGLISH ASH
WALNUT & MAHOGANY

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

JOSEPH OWEN & SONS
Limited
BOROUGH, LONDON, S.E.1,

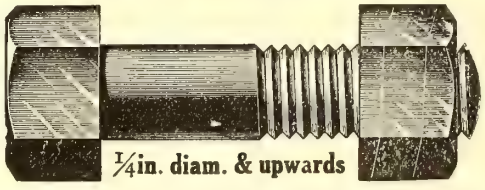
Telephone: Hop 3811. Telegrams: "Bucheron, Sedist."

'Phone 3373 Museum.

Aircraft

National Aircraft Mfg. Co., Ltd.,
15, Drummond Crescent,
Seymour St., Euston Rd., London, N.W.1.

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

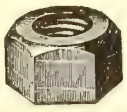
(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE
"HELICOID" LOCK-NUT
(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅛in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

The demand for National Service of our entire output of the famous Bowden Wire Mechanism—which provides the perfect method of transmitting power by a tortuous route—prevents our acceptance for the present of any orders except those classified under a high priority.

Established 1897.

TRADE MARK

Bowden Wire Ltd.
LONDON
VICTORIA ROAD
WILLESDEN JUNCTION, N.W.10

Godbolds

PRESS-WORK and SPINNINGS

and Sheet Metal (War) Work generally.

The LONDON ALUMINIUM Co., Ltd., Aircraft Dept., Westwood Road, Aston, B'ham. 'Phone: EAST 497.

Auster LTD

for **AUSTER-TRIPLEX SHIELDS**

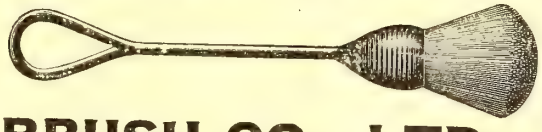
AERONAUTICAL ACCESSORIES

LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."

BIRMINGHAM: Barford Street.
Telephone: Midland 2123.
Telegrams: "Auster, Birmingham."

'FEARLESS' ENGINE CLEANING BRUSHES

As used by the R.F.C.



Send Trade Card for FREE SAMPLE.

FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD. LONDON ——— N.16.

HIDE GLUES

FOR AIRSCREWS AND AIRCRAFT CONSTRUOTION.

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

"NOVELLON" DOPE

AND AEROPLANE VARNISH.

CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G.

COMPANY, LIMITED,

Telegrams: *"Cellulate, London."* 8, WATERLOO PLACE, S.W.1. *'Phone: Regent 4015.*

Also at Spondon, Derby; and Maybury Gardens, High Road, Willesden Green. N.W.10. *(Telephone: Willesden 2380.)*

THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

PLYWOOD

IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.

Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.

Y.E.S. Telegrams: Y.E.S. LEEDS. Y.E.S. Telephone: 25004 LEEDS.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'Eatonia' Process).

Y.E.S. B.8. BRONZE
(Under A.I.D. Inspection).

PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3′ 6″ long.

THE MOST DURABLE YET PRODUCED.

SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, Ltd.,
WORTLEY, LEEDS.

Y.E.S. Y.E.S.

METAL FITTINGS FOR A. V. ROE PLANES.

BRACING PLATES

Drawing SS 172. Items 2, 3, 4 and 5.
Drawing SS 190. Item 4.
Drawing SS 264. Items 2, 3, 4, 5 and 6.

ALSO

COVER PLATES

Drawing F 80. Item 24.
Drawing F 80. Item 25.

A. LLOYD & SONS, LTD.,
Pier Wharf, Deptford, S.E.8, London.

REPETITION WORK in large quantities.

WAR SERVICE ONLY

SMALL
PRESSINGS
STAMPINGS
AND
BENT WIRE GOODS
SEND US YOUR ENQUIRIES

SMITH AND DAVIS, LIMITED.
Stampers and Piercers,
HAMPTON STREET, BIRMINGHAM.

WOOLER ENGINEERING CO. LTD.

Specialise in MACHINED METAL FITTINGS, and can quote for PROMPT DELIVERY your requirements in EYE BOLTS, SOCKETS, ELEVATOR and FLAP LEVERS, HINGES, &c.

Do you want your Stampings and Castings Accurately Machined? Send us your enquiries.

Large Stock of All Sizes R.A.F. No. 3 A Spec.
Limited Stock R.A.F. No. 1 E Spec.

OLD OAK COMMON LANE,
WILLESDEN JUNCTION, N.W. 10.
Phone: Willesden 117 Telegrams: Two Stroke, London.

AEROPLANE TANKS AND COWLS.

BEST WORKMANSHIP.
—QUICK DESPATCH.—

ZEPHYR VENTILATING Co. Ltd.,
LYPPIATT ROAD, **BRISTOL.**
Telegrams:—"ZEPHYR," BRISTOL.

THE
CAMDEN CONSTRUCTION CO.
LIMITED

Manufacturers of
WOOD PARTS and UNITS for AEROPLANES.

DELIVERIES GUARANTEED UNDER PENALTY

289, High Street, Camden Town. N.W.1.

Aeroplane Steel Sheets
as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

SMETHWICK, BIRMINGHAM
Telegraphic Address: "Bernico," Birmingham. Telephone No. 1 224 Smethwick.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

THE POOLE AVIATION CO.
POOLE, DORSET.

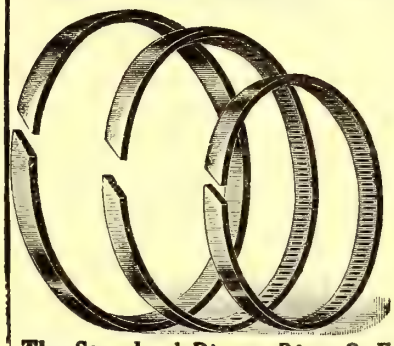
Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

Cast-Iron Hammered Piston Rings



(By the Davy-Robertson-Process.
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.

Telephone No. 2149.
Telegrams—
"Ocean," Sheffield.

The Standard Piston Ring & Engineering Co., Ltd.
Don Road, Sheffield.

The Air Navigation Co., Ltd.

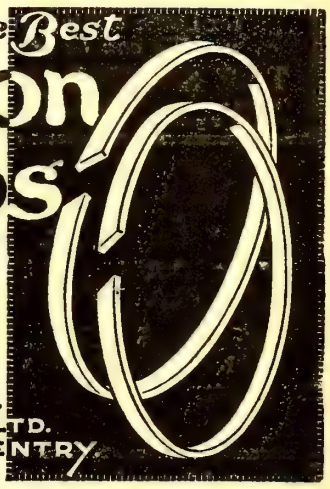
BLERIOT & SPAD,
ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director,
Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

The Best
Piston Rings



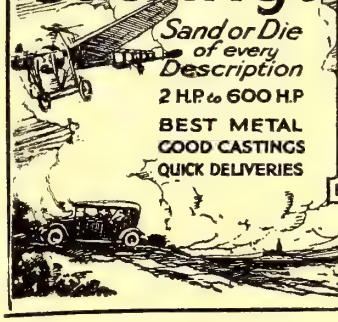
Scientifically designed. Made from high tensile cast iron and hammered to give an even radial distribution of pressure. Gastight. Sizes up to 30 in. diam.

***The* BRITISH CHUCK & PISTON RING CO. LTD.**
***Holbrook Lane,* COVENTRY.**

STAMPINGS
WASHERS
REPETITION WORK
in all Metals
BRIGHT DRAWN STEEL
FOR
AIRCRAFT and MOTOR WORK

J. B. GUTHRIE & SON
(JOHN J. GUTHRIE)
30, ST. MARY AXE, LONDON
TELEGRAMS—BUSIRIS LED, LONDON. E.C.3.
TELEPHONE—AVENUE 1432.

Aluminium Castings



Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

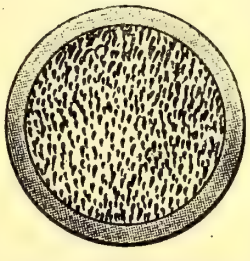
Contract to H.M. Government
Chill Castings for Aeroplanes a Speciality.

Telephones: 5846 City. 4879 Central.
Telegrams: Kranksacs, Isling London

R. W. COAN
219, COSWELL ROAD, LONDON E.C.

COAN CASTS CLEAN CRANK CASES

ANTOL CASE HARD



Harden your Screws and Gauges with **ANTOL.**
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1.

"CROID"
LIQUID GLUE

as adopted by
H.M. Department of Aeronautical Supplies for Aircraft Construction.

THE IMPROVED LIQUID GLUES COMPANY, Ltd.
Great Hermitage Street, London, E.1.
'Phone: Avenue 3178. Tel.: Excroiden, 'Phone, London.

TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

CITY OF LONDON AIRCRAFT.
Manufacture of COWLS, MANIFOLDS, TANKS, RADIATORS, SHEET METAL PARTS, AND COPPER PIPE WORK.
Offices: SPENCER STREET, ISLINGTON, N.1.

SEND US YOUR ENQUIRIES.
We are well equipped for quick production for Lathe Milling, Drilling & Bench Work.
:: *We can be of assistance to you.* ::
THE STONEBRIDGE ELEC. Co., Ltd.
'Phone: MOLESEY 343. WINDMILL ROAD, HAMPTON HILL, MIDSX.

FREDERICK WARD,
Full Right Up With Machine Work,
CAN STILL UNDERTAKE PATTERNS AND SMALL HIGH-CLASS ASSEMBLIES, MACHINE PARTS TO BE SUPPLIED.
ALLSOP ST., UPPER BAKER ST., N.W.
'Phone—PADDINGTON 4743.

NAME PLATES.
WE SPECIALISE IN EVERY DESCRIPTION OF NAME PLATES IN METAL, IVORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

PEGAMOID BRAND LEATHER CLOTH.
The Best Waterproof Covering for Railway, Tramway, Aeroplane, Motor Boat, Cushions, Seats, etc.
Sole Manufacturers: **NEW PEGAMOID LIMITED,** 134 Queen Victoria St., London :: :: E.C.4.
Telegrams—Pegamoid, Phone, London. Telephone—City 9704 (2 lines). Cables A B C 5th Edition and Private.

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: **Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work.** Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

NAME PLATES and LABELS
AEROPLANE INSTRUCTION PLATES, DIALS, SCALES, &c.
MACHINE AND CHEMICAL ENGRAVING AND STAMPINGS.
ALBION M.M. Co, 68, VICTORIA ST., S.W.1.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade **MENDINE** Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF.
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

SPECIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS, in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per line. For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1.

PATENTS.

AGE & ROWLINGSON, Chartered Patent gents (Consulting Engineer, Mr. S. E. age, A.M.Inst.C.E.), 27, Chancery Lane, ondon, W.C. Tel. 332 Central.

enry Skerrett (H. N. Skerrett, A.I.A.E., I.Mech.E., Associate I.E.E., Fellow of the nartered Institute of Patent Agents) Patents, signs and trade marks.—24, Temple Row, rmingham.

etcher Wilson, Chartered Patent Agent, gistered United States Patent Attorney, gh Street Chambers, Coventry.

SITUATIONS VACANT.

ane Assemblers wanted, immediate D.H. perience if possible. Fare paid. Flat rate d good shop bonus given. No one on vernment work will be engaged.—Applica- ns must be made through your nearest ployment Exchange, mentioning this paper l No. 3610.

istant Draughtsman required with aircraft erience, immediate. Good wages. Fare d to the works, which are in South Wales. one on Government work need apply.— plications must be made through your rest Employment Exchange, mentioning paper and No. 3639.

Large Factory in N.W. London, manufac- ing machines of their own design, require umber of detail draughtsmen with first- s aeronautical experience. Exceptional op- tunities and permanent positions offered to able men. No one at present engaged on vernment work or resident more than 10 es away need write to Box No. 480, Sells, ., 168, Fleet Street, E.C.4.

inetmakers, Patternmakers, Coachbuilders, penters and **Joiners,** with experience of plane work, or men desirous of obtaining plane work, required in Nottingham dis- t. No person already engaged on Govern- nt work or residing more than 10 miles ty will be engaged.—Apply by letter to No. 3669. THE AEROPLANE, 166, Picca- W.1.

uired, thoroughly experienced lady tracer aircraft work, London district, one used to il. No person resident more than 10 miles y or already on Government work will taken.—Reply, stating age, experience, salary required, to Box No. 3676, THE OPLANE, 166, Piccadilly, W.1.

uired, first-class lady viewers for factory, don district. Preferably experienced in plane work, and able to read micrometer Verneir accurately. No one resident e than 10 miles away or already on ernment work need apply.—Reply, stating , full particulars of qualifications, and ry required, to Box No. 3675, THE AERO- E, 166, Piccadilly, W.1.

Clerks required for engineering works in t. Those with aeroplane engine and aero- e component costing experience preferred. y live men with ability to think for them- es need apply. Good wages paid to the t men. No person resident more than 10 s away or already employed on Govern- t work will be engaged. Must be ine- le for military service.—Apply, stating experience, and salary required, to Box 3673, THE AEROPLANE, 166, Piccadilly,

Experienced Buyer required to understudy and to take control, when required, of purchasing department of aircraft, coachbuilding, and motor works employing 1,200 hands. Permanent and progressive berth to suitable man. No person resident more than 10 miles distant or engaged on Government work need apply. —Write, stating experience and salary required, to Box No. 3674, THE AEROPLANE, 166, Piccadilly, W.1.

Aeroplane Erectors, Engine Fitters, Wood-workers, and **Wood Machinists** wanted at once in N.W. London. Must be really good workmen. No one already on Government work or living more than 10 miles away will be employed.—Apply, Box No. 3672, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted by an aircraft firm building the latest type of machine, a foreman of erecting shop; must be a live man and know his job; excellent prospects and a good future. No one on Government work need apply.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3666.

ESTAB. 12 YEARS.

THE COUNTY WELDING WORKS CO.,

'Phone: Romford 87.

ROMFORD, E.

IN STOCK

DH. 4.9.9.A 10.

OR FEW DAYS.

PRESSINGS

WELDED FITTINGS

6665, 13027
6666, 13766
6493, 13767
13025, 13737
13095, 13742
10522, 13816
&c., &c., &c.

Ladies wanted with knowledge of drawing and tracing for aircraft works, Southampton district. No one on Government work need apply.—Apply your nearest Employment Exchange, mentioning No. A5434.

Aeroplane Erectors wanted, with good experience; also engine fitters, with aeroplane or motor experience on engine fitting, required for large factory near Liverpool. Also several men for laying out operations and materials. Must have machine shop and drawing office experience. No person already on Government work will be engaged.—Apply your nearest Employment Exchange, mentioning No. A5427.

Aeroplane Fittings.—Experienced man to superintend making, brazing, welding, machinery, blue prints; knowledge of sheet metal work. Willesden district. No one on Government work or residing over 10 miles away need apply.—Write, Box 933, Dale's Advertising Agency, 46, Cannon Street, E.C.4.

Chief Storekeeper required by well-known aircraft company, one with knowledge of aircraft requirements preferred; liberal salary; hours, 9 a.m. to 7 p.m.; occasional Sundays extra. No one already on Government work can apply, or residing more than 10 miles from London.—Apply by letter, Clayton's Advertising Offices, 52, Shaftesbury Avenue, W.1.

Wanted first-class Progress Man for propeller works in N.W. district. No one residing more than 10 miles away or already engaged on Government work need apply.—Box No. 3670, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Shop or General Foreman seeks engagement. First-class experience.—Apply, Box No. 3660, THE AEROPLANE, 166, Piccadilly, W.1.

Advertiser, 35 years' practical experience in sheet metal department, fitting, and machine shop. Expert craftsman, open for engagement as works manager; prepared to consider any position where brains, skill, and hard work are essential and appreciated. Must be a firm of repute, building complete machines. London preferred.—Box No. 3651, THE AEROPLANE, 166, Piccadilly, W.1.

Manager of Propeller Works disengaged shortly desires position, similar or otherwise. Ten years' practical aircraft experience, designing and construction. 46. Has had excellent results in employment and teaching of female labour.—Box No. 3650, THE AEROPLANE, 166, Piccadilly, W.1.

Gentleman, founder and for many years managing director of a well-known aircraft firm, now proprietor of an aircraft factory, which takes up very little of his time, desires agency or managership. Has an office in best part of West End. Can speak several languages, and has large business experience. Capable salesman, having travelled for important firms all over England and the Continent.—Reply, "V. L. H.," Box No. 3668, THE AEROPLANE, 166, Piccadilly, W.1.

Mill Foreman (aircraft) disengaged. Practical and reliable. Good class work only. Recent engagement in large London factory; all parts.—W.C., 52, Stanger Road, South Norwood.

Advertiser, 36, 20 years' practical experience of good woodwork; two years' engineering experience; good technical and some practical knowledge of aeroplanes, accustomed to machinery and charge of labour; would superintend manufacture of woodwork or assemble machines.—Box No. 3662, THE AEROPLANE, 166, Piccadilly, W.1.

Foreman of machine shop requires position of greater scope as foreman of machine shop or tool room. Keen organiser, with high-class knowledge of rapid production. Seaplane, aeroplane, or aero engine factory preferred. Aged 30. Fourteen years' solid experience; well educated.—Box No. 3661, THE AEROPLANE, 166, Piccadilly, W.1.

Practical and Technical Sheet Metal worker is open to lay out accurate patterns from Blue Prints for all classes of sheet metal work.—R.W. Cooper, 30, Minstead Road, Erdington, Birmingham.

Oxy-Acetylene Welders (trained) supplied to firms on Government work in London or Provinces. Steel or aluminium. Over 300 already placed with satisfactory results.—Apply Women's Service, 58, Victoria Street, London, S.W.1.

SITUATIONS WANTED.—continued.

Accountant-Secretary, certified Grade 3, disengaged, seeks situation on national work, North Midlands preferred; good references; commercial experience; energetic organiser, used to heavy correspondence, assisting Management or Cashier's Department.—Apply Box No. 3677, The Aeroplane, 166, Piccadilly, W.1.

Man, 42, ineligible for Army, seeks situation as foreman, charge hand, or capable of taking entire charge of works. Varied experience, aeroplanes, equipment, building, woodworking machines, etc., years' experience with employment and management of men. Unique methods of output and production.—Box No. 3564, The Aeroplane, 166, Piccadilly, W.1.

Japanese (University man), knowledge of engineering, technology, electricity, chemisty, etc., aged 24, seeks berth as assistant, or any responsibility for work of national importance; at present engaged; arrangements can be made.—Write, Kato. 70, Sinclair Road, West Kensington, W.14.

Experienced Man on aircraft construction requires responsible post; practical man, good draughtsman, planning, costing, progress experience; used to D.H., Sopwith, Bristol, H.P. machines.—Box No. 3667, The Aeroplane, 166, Piccadilly, W.1.

Painting, Enamelling, Japanning—Foreman seeks engagement. Systematic production; large output; unskilled labour.—Box No. 3665, The Aeroplane, 166, Piccadilly, W.1.

Thorough all-round practical engineer, aged 33, is open to immediate engagement as assistant works manager or general foreman; wide experience of engine building and rapid production of aeroplane parts; tactful control of male and female labour.—Apply Box No. 3671, The Aeroplane, 166, Piccadilly, W.1.

ENGINEERING.

British School of Aeronautics. — Aircraft Engineering Course; Aero Design; Aero Construction; Aero Draughtsmanship; Mechanical Engineering. — Pennington's, 254, Oxford Road, Manchester.

MODELS.

Model Aeroplane, flies ¼ mile circular flight, carriage paid, 3s. 6d. "I can thoroughly recommend your machines." Testimonial from Dr. Adams, Union Road, Sheffield. Thousands satisfied, testimonials from all parts.—Dept. C., Bristol Model Aeroplane Depôt, Eastville, Bristol.

T. W. K. Clarke and Co., Ltd., Model Department, Hampton Wick.—Though we are busy with full-size aeroplane parts orders, we still build models as we did in 1906. Sopwith Biplanes, etc., in Stock.—Send 4 pence for our illustrated List, 120 items and 14 models; certain metal goods are out of stock.

HAULAGE.

Steam and Petrol Motor Wagons for Hire, for timber transport.—Apply, Silwood Storage Co., Ltd., 7, Victoria Street, Westminster, S.W. Telephone, Victoria 6882.

PERSONAL.

L. Hall.—Please write Oaklands or Smithfield. Urgent.—Mater.

FOR SALE.

Aeroplane Parts Factory.—One acre of freehold land suitable for erection of factory to be sold—immediately adjoining electric power sub-station, so that power could be obtained. Frontage, 150 ft. to an old road, about 8 miles north of London, within easy reach of goods station (G.E.R.). Price, £300.—Apply, Stanley Parkes and Brown, 816, High Road, N.17.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid. —Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Overhand Planer, One Thicknessing Machine, and **Fourcutter** for sale.—Box No. 3658, The Aeroplane, 166, Piccadilly, W.1.

Scripps-Booth. Late 1916. Done 4,500 miles. Electric lamps, spare wheel and tyre; self-starter; beautiful order. £215.—Box No. 3664, The Aeroplane, 166, Piccadilly, W.1.

Airship Seats, completely upholstered or cane-work only; favourable quotations given and regular deliveries guaranteed.—Frank D. Harrison, Stapleford, Nottingham

Nuts! Nuts! Nuts!—We specialise on hexagon nuts. Inquiries solicited.—"Carleton" Manufacturing Co., Ltd., Moseley Road, Birmingham.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1.

Metal Fittings, heavy and light, brazing, welding, annealing, etc. Accurate work and prompt deliveries. Prices right. Immediate attention to early inquiries.—Walker and Hutton, Engineers, Scarborough.

Press Work, small stampings, press tools made; expert work; quick deliveries; A class preferred.—Palmerston Works, 51A, Russell Road, Forest Road, Walthamstow, E.17.

Aircraft Joiner, having small premises London, wants work; ailerons or rear fuselages preferred, or open to suggestions.—Apply, Box 3663, The Aeroplane, 166, Piccadilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Sele air-dried timber as supplied to leading structors in Britain and the Continent. S Spruce, Ash, Poplar; Hickory and Skids; Three-ply; Thin Cedar and Maho for Floats; Walnut for Propellers.—Wi Mallinson and Sons, Ltd., Hackney 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all ties, suitable for Aircraft Work. Delivery stock.—John MacLennan and Co., 30, gate Street, London, E.C.1. (See Adve ment Page IV. of cover and Buyers' Gu

Aeroplane Seats. We can give quick de of cane seats, A.G.S. 264, or other pat guaranteed pass inspection. Write u anything required in cane work.—The W brook Company, Leicester.

PUBLICATIONS

The following books may be obtained free by application to The Aeroplane General Publishing Co., Ltd., 2, B Buildings, E.C.:—

Richthofen's **"The Red Air Fighter,"**

Blakeney's **"How An Aeroplane Is 5/4.**

The Aeroplane Blue Book, 1/8.

Dixie's **"Air Navigation for Flight Off 11/-.**

6th Revised and Enlarged Editi with "Types of Aeroplanes" down t

THE AEROPLANE SPEAKS

By Capt. H. Barber, A.F.Ae

Price, 7s. 6d. net.; 8s. post free

McBride Nast & Co., 2, Breams Bui E.C.

Just published. 360 pp. with Illustrations, 4¾ 6¾ in., limp cloth. Price 6/- net (postage, 4

The Aviation Pocket Book for 1

By R. BORLASE MATTHEWS, Assoc.M.Inst.C.E., F.Ae.S.

Containing data on Aeroplane Theory and I Air Pressure and Resistance, Structural Ma Engines, Typical Aeroplanes, Piloting, R Meteorological Data, Scouting and Signallin etc. With Glossary and other information o to all Interested in Aviation.

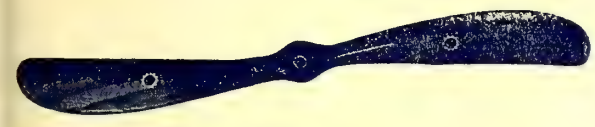
Prospectus on Application.

London: CROSBY LOCKWOOD & 7, Stationers' Hall Court, E.C.



CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

OXY-ACETYLENE
WELDING & CUTTING
PLANT

The Latest and Best Type of Plant for this Process as installed by the leading Aircraft, Shipbuilding and Engineering Firms, H.M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C. ATOZ G.B.

Carbide. Flarelights, Handlamps.
Petrol and Oil Storage Drums of any capacity. Steel Barrels Sheet Metal Work for Aircraft, etc.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "Flamma, Vic, London." Telephone: Victoria 4830.

WYCOMBE AIRCRAFT CONSTRUCTORS, Limited.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

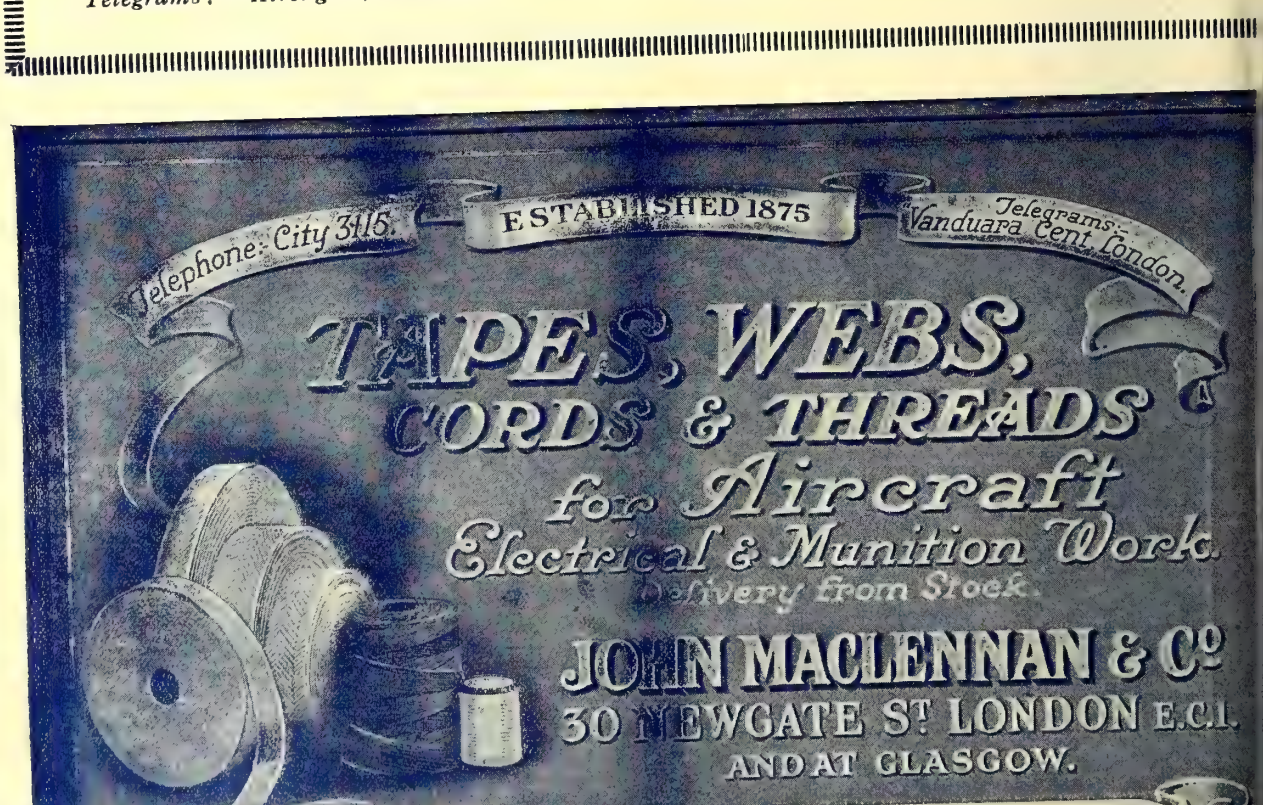
HIGH WYCOMBE.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams: "*Airengine, London*" *Telephones:* *Gerrara* 8165; *Richmond* 1293.



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Pa London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, Lond

THE AEROPLANE

Edited by C. G. Grey

WEDNESDAY JUNE 19, 1918.

Vol. XIV. No. 25. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

John Dawson and Co. (NEWCASTLE-ON-TYNE), Ltd. Air Craft

Newcastle-on-Tyne.
Telephone ... ... CENTRAL NEWCASTLE 2604.
Telegrams ... "DEPENDABLE, NEWCASTLE."

Southampton House,
High Holborn, W.C. 1.
Telephone ... ... HOLBORN 1876.

Auster LONDON. FOR Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE
The Original DOPE Non-Poisonous
SEE ADVERT. INSIDE.

WAKEFIELD Castrol MOTOR OIL
"R" (Racing)
THE ONE OIL FOR ALL AERO ENGINES
Immediate delivery to rails guaranteed.
SBAC THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

TELEPHONE: OLDBURY 111. ACCLES & POLLOCK, LIMITED. TELEGRAMS:- ACCLES OLDBURY.
Weldless steel tubes for aircraft construction. Tube manipulation and presswork.
SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.
TRIPLEX SAFETY GLASS
The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Gothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

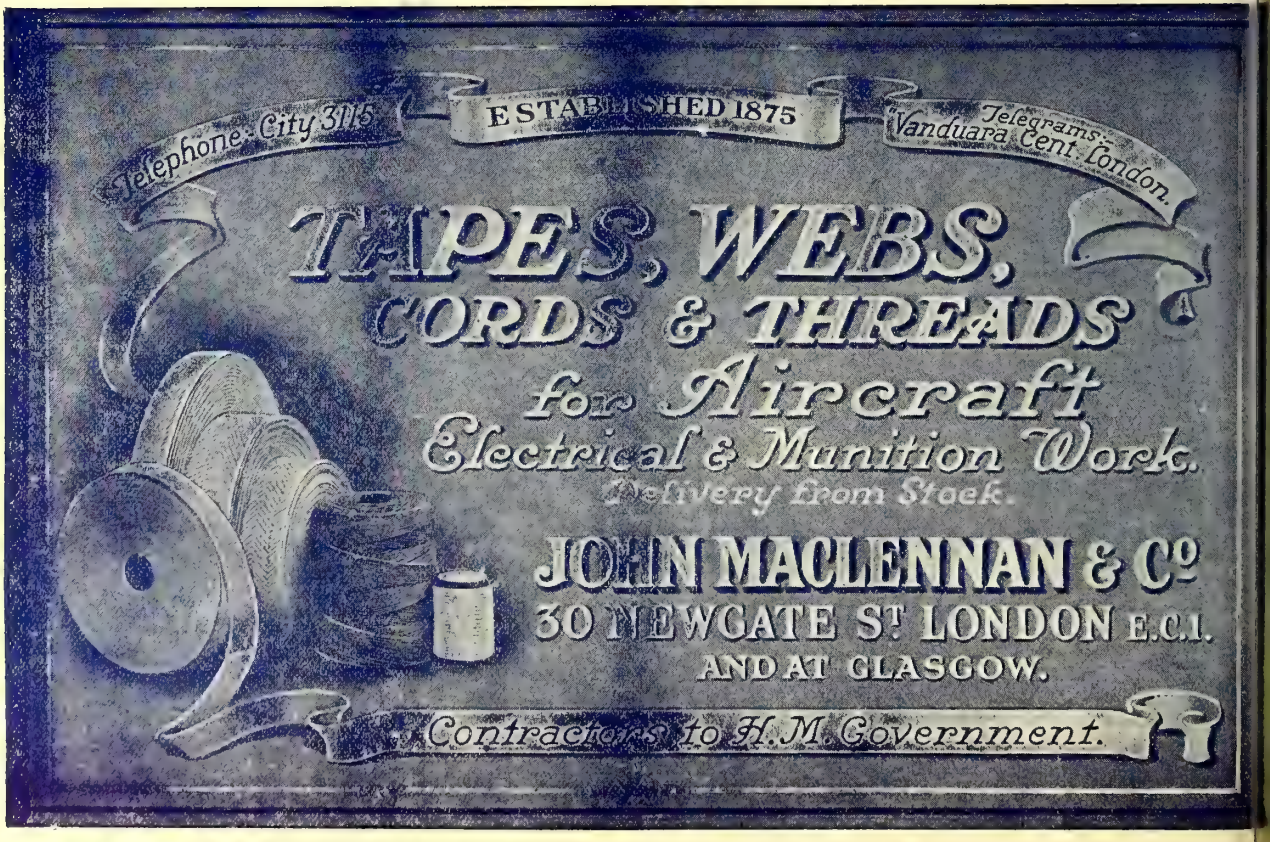
Chemical and Physical tests are made on our own premises, and our **Castings**, both **Sand** and **Die**, are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons**, thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD

Cambridge Street, BIRMINGHAM.



EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT



AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

30, Regent Street, Piccadilly, S.W.1.

Wire—"Ridleypren, Piccy, London."
"Phone—280 Gerrard

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.

CONTRACTORS TO THE AIR BOARD.

60-66, ROCHESTER ROW, LONDON, S.W.1.

Telephone: Vic. 7570 (3 lines).

Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.

FOR nearly four years the entire SIDDELEY-DEASY organisation and resources have been devoted to the service of the nation. In that period—and in that service—a position of absolute supremacy has been achieved.

THE
SIDDELEY-DEASY
MOTOR CAR CO. LTD.
COVENTRY

Contractors to H.M. Air Ministry; Designers and Constructors of Aero Engines, Aeroplanes, and of luxurious Motor Carriages.


WHITEHEAD
AIRCRAFT
RICHMOND
SURRE

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY: 2 pints of glue.
LOADING: 900 watts. 3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



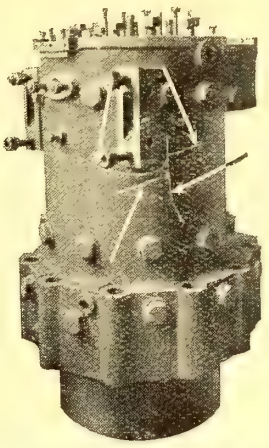
List No. 40.
Price 47/6
(Spare Elements 3/6 each)

Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 50% advance.
Carriage extra on orders under £3 net value.

BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS
EDMONTON, LONDON, N.18



THE picture abov is that of the cylinder of a Diesel engine belong ing to a motor ship. This cylinder was badly cracked in several places, making it a delicate operati n to weld without distorting the metal. Ba imar made a successful job in a very shor t time. The cylinder is about five feet in height and weighs about one ton. This repair was made to the order of one of England's largest shipbuilders

Ship Repairs

MANY illustrated descriptions of wonderful repairs to ships are printed in the technical press of America. These repairs are made by welding. The saving of time, materials, and money is so obvious that shipowners and shipbuilders cannot ignore it.

Ships are wanted at sea—not in dock—so any method that will speed up repairs will be appreciated.

Barimar's Travelling Plants

and men go to any port to make repairs. Many breakages, even in large and heavy pieces, can be repaired quickly by welding; saving an expensive and possibly delayed replacement, and sometimes avoiding the necessity of dry-docking the ship.

Barimar Scientific Welding Service handles broken and defective castings in any metal. Cast-iron and bronze propellers, stern frames, rudder frames, tail shafts, engines, boilers, crank shafts, cross-heads, connecting rods, and other heavy parts.

Write for Our Booklet

"The Welding Test" will give you a lot of information about our work. If you have a repair to make now, a copy of the book will be sent free. If you wish a copy for filing, please send three penny stamps for postage. Please ask for Manual "B.C." and mention "THE AEROPLANE."

Send Light Repairs to London

Remove all fittings, attach label bearing your name and address, and send broken part carriage paid. Send complete instructions by post.

Address to Dept. "B C."—

BARIMAR

LIMITED,
The Scientific Welding Engineers,

10, Poland Street, Oxford Street, London, W.1.

Telegrams: Bariquamar Reg. London.
Telephone: Gerrard 8173.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO
H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

MEERLOO

WE can accept your orders for immediate deliveries in any quantities of

Description.	Size	A.G.S. No.
Nuts	4BA	115C
"	2BA	115B
"	6BA	115D
"	4BA (LH)	238C
"	2BA (LH)	238B
"	6BA (LH)	238D
"	¼ BSF	116A
"	9/32 BSF	116B
"	5/16 BSF	116C
"	11/32 BSF	116D
"	⅜ BSF	116E
"	¼ BSF	239A
"	¼ BSF (Thin)	117A

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

A.G.S. PARTS

We have the most modern plant in London engaged on the day and night production of A.G.S. Parts. We are equipped to fill your needs in the quickest possible time. Let us know your requirements.

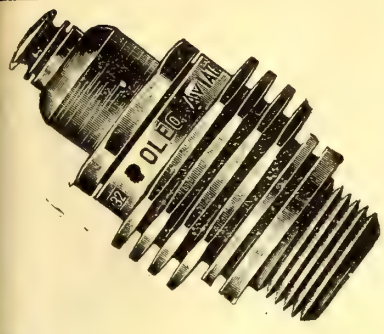
'Phone: REGENT 1394. Wires: "AEROMEECOL, PHONE, LONDON."

THE MEERLOO ENGINEERING CO LTD

CONTRACTORS TO THE AIR BOARD.

Head Office:
199, PICCADILLY, LONDON, W.1.

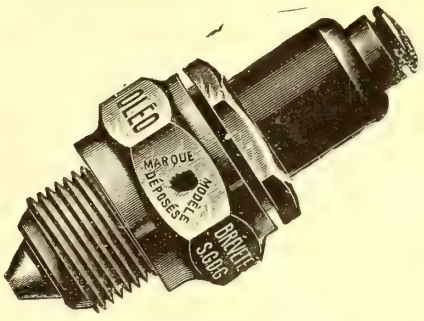
JOHN MEERLOO, Junr., Managing Director.



TYPE No. 32.



"The Smile of Success."



TYPE No. 27G.

OLEO were the first Aero Plugs ever made.
OLEO won the Aero Grand Prix SIX TIMES in succession.
OLEO Plugs have been supplied to the Government since 1913.
OLEO Aero Plugs have the "Largest Sale in the World."
OLEO Plugs have won over £30,000 in prizes.
OLEO Plugs were the first to Loop the Loop.
OLEO Plugs were the first to Cross the Alps.
OLEO Plugs are supplied to NINE Governments.

OLEO PLUGS

LEO RIPAULT & Co.
64A POLAND ST. LONDON. W.
TELEGRAMS RIPAULT REG. LONDON TELEPHONE GERRARD 7758

W. CANNING & Co. Gt. Hampton Street.

AND 18/20, ST. JOHN'S SQUARE, CLERKENWELL, LONDON, E.C. 1.

BIRMINGHAM

MANUFACTURERS OF

Motor Generators, Low Voltage Dynamos, Vats, Chemicals, Complete Plant for

ELECTRO - ZINCING (COLD GALVANIZING)

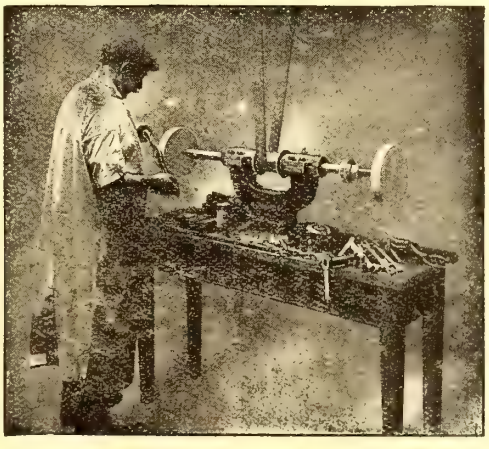


For Aeroplane Stay Wires, Connections.

Also NICKEL, COPPER AND BRASS-PLATING AND TINNING, &c., OUTFITS.

Contractors to the British, Colonial, and Foreign Governments, Railways and Shipyards.

POLISHING MACHINERY & MATERIALS FOR AERO ENGINE & OTHER PARTS.



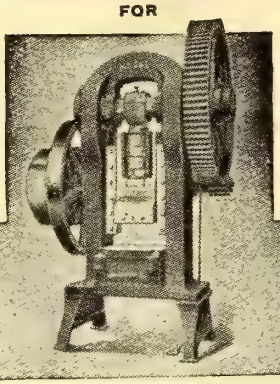
POLISHING LATHES, with Self-Oiling and Ball Bearings. EMERY GRINDERS, POLISHING MOPS, POLISHING BOBS, POLISHING COMPOSITIONS, "LUSTRE" POLISH.

BLISS

PRESSES & DIES
FOR

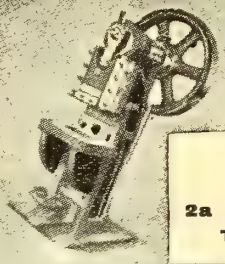
AEROPLANE

SEND YOUR STAMPING PROPOSITIONS TO US.



STAMPINGS

WE CAN DESIGN THE DIES AND RECOMMEND SUITABLE PRESSES.





WRITE TO

E. W. BLISS CO.,

2a POCOCK STREET, BLACKFRIARS RD., LONDON, S.E.1

TELEPHONE: HOP 4340 TELEGRAMS: "BLISSDON, LONDON."

ESTABLISHED 1912

CONTRACTORS TO H.M. AIR MINISTRY

THE

SUPERMARINE

AVIATION WORKS, LTD.

DESIGNERS & CONSTRUCTORS OF **FLYING BOATS.**

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. SCOTT-PAINE, DIRECTOR & GEN. MANAGER.

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

OFFICES,—
SOUTHAMPTON, Eng.

ARNOTT-&-HARRISON Ltd



DE HAVILLAND SPECIALISTS.

DO YOU REQUIRE
STRUT SOCKETS?

AT YOUR SERVICE

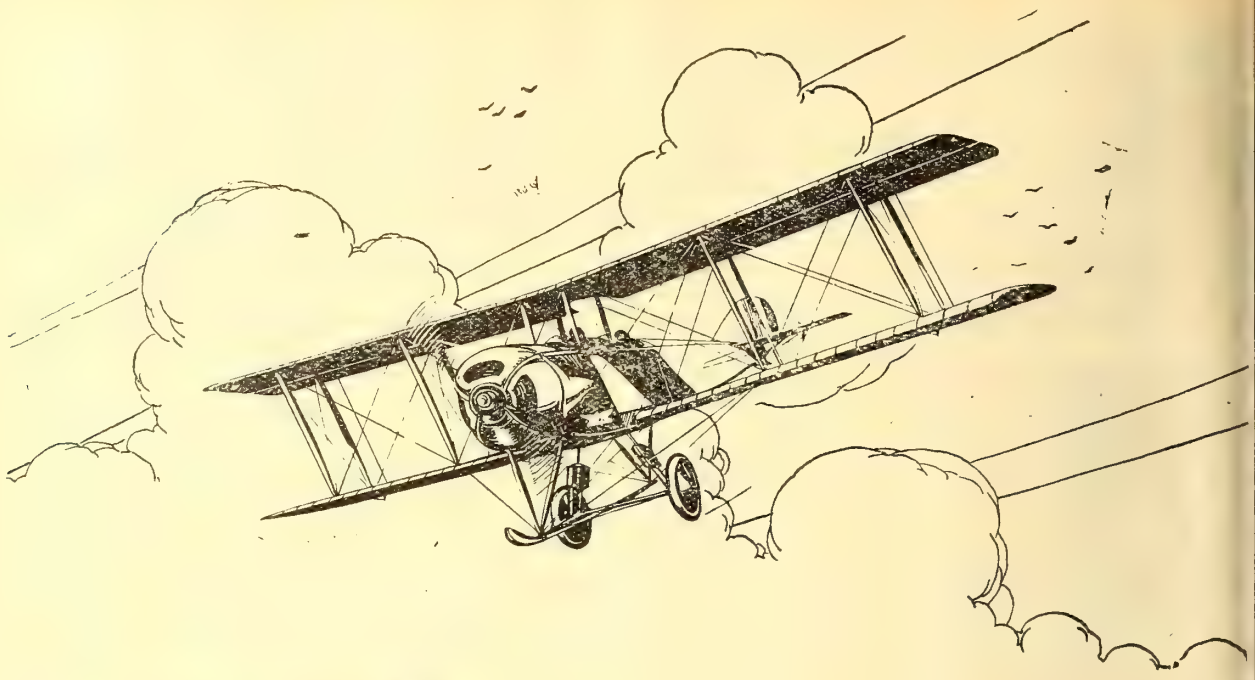
HYTHE ROAD · WILLESDEN, N·W·10·

Phone: Willesden 2297 (2 lines)

Telegrams: ARNOTHARRI, LONDON·

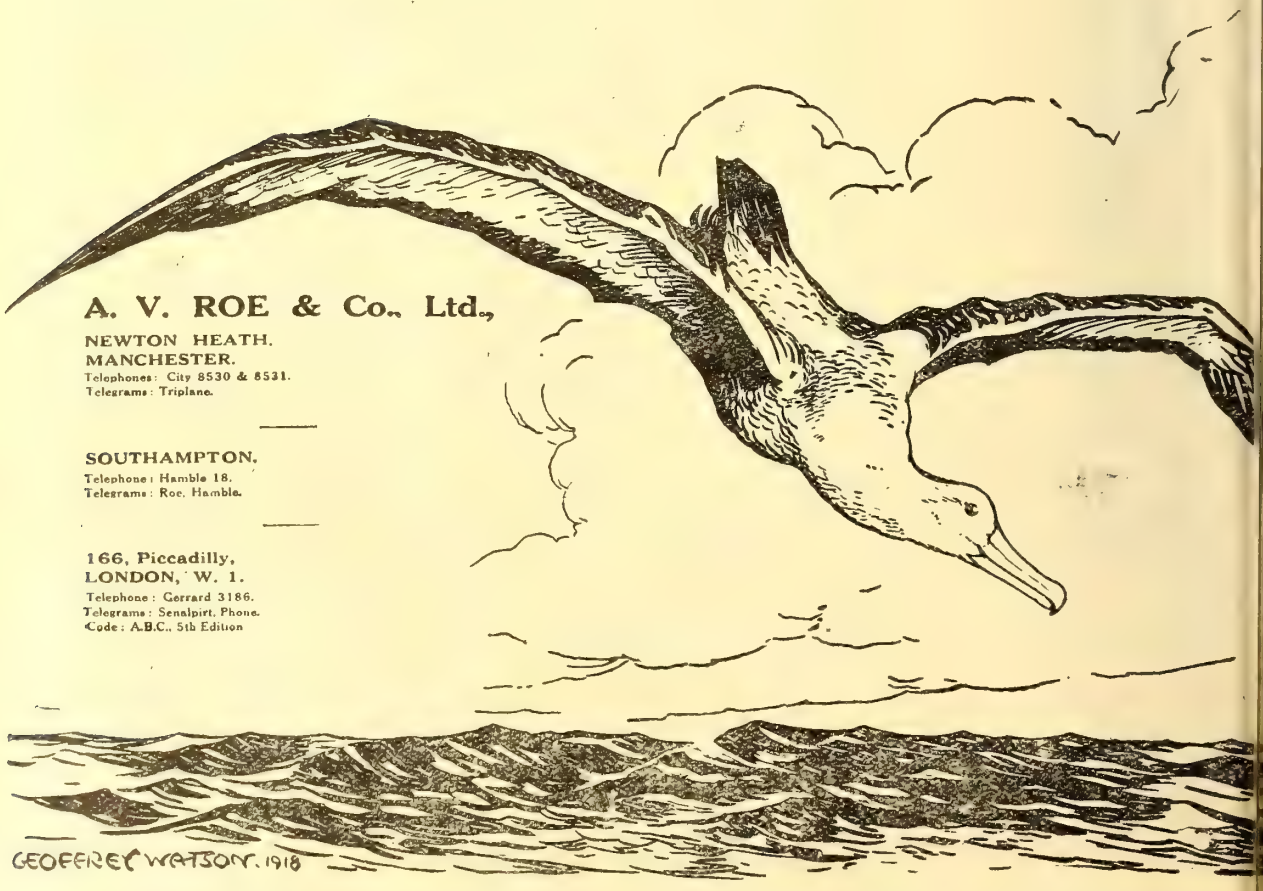
"A & H" SMALL PARTS TO THE RESCUE.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.



AVRO

AEROPLANES
AND
PARTS.



A. V. ROE & Co., Ltd.,

NEWTON HEATH.
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Sensalpirt, Phone.
Code: A.B.C., 5th Edition

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices o The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, Year, $8.
U.S.A., 1 Year, $8.50c.

ON ALLOTMENTS ON PARNASSUS.—(*Concluded*)

ast week there was published the first of a series of
es by people in the Flying Services, illustrative of
ous phases of flying. One could hardly claim that
writers had cultivated the highest poetic heights of
assus, so one made bold to class them among the
ment-holders who are doing such valuable amateur
in other fields of war activity.—C. G. G.]

THE DISTANT WAR AREAS.

quite another kind, more akin to the product of
home aerodrome, are two sets of verses from Meso-
mia. Both sets go to an old familiar tune, and the
at any rate, may be used with desirable effect on
sirable observers and pilots :—

SONG OF THE R.E.8.

(*Tune*, "*Wrap me up in my Tarpaulin Jacket.*")

"A stalwart young Pilot sat sighing,
And as in his biplane he sat, he sat,
Quoth he, 'Oh I fain would be flying,
But my futile Observer's so fat.'"

Chorus—

"Wrap me up in my old leather jacket,
Pull my flying cap over my brow, my brow,
I'm wanting to fly home to 'Blighty,'
I wonder who's kissing her now (bow-wow)."

"Oh had I the wings of a Quadruplane,
A Pup, Camel, Dolphin or Spad, or Spad,
High into the skies would I leap again,
Away from this corpulent lad."

"Oh get me two hefty Ak Emmas,
And give my propeller a swing, a swing,
To rid me of all these dilemmas,
Shove sandbags inside the dam thing."

"Then homewards I'll fly in a hurry,
And hustle o'er mountain and plain, and plain,
To free all the girls from their worry,
And talk of my prowess again."

"A lonely Observer stayed crying,
On a can of Shell spirit he sat, he sat,
Said he, 'Well I've no wish for dying,
Oh where did I hang up my hat?'"

"A hero is that noble fellow,
His last 'Write-off' makes up a score (and more),
My gills feel a little bit yellow,
The bones of my back are still sore."

"I don't blame the lad for our last crash,
A mule cart stood there in his way, his way.
The mule ate our 'bus as a bran mash,
There were no 'spares' worth bringing away."

"Pull out of the hangars six 'buses,
And set them all out in a row, a row,
With a Pilot who ne'er drinks nor cusses,
I'll fly along mournful and slow."

ssibly Mesopotamia does breed boredom, but, to George Robey's old joke, which may still be new Messopot," it is nothing to the Mess-up-at-'ome-'ere. e second set of verses is purely narrative. Some- it reminds one of the Border Poetry collated by one op Percy—one seems to remember that he was a op. The verses are beautifully disjointed and dis- ected, but they manage to convey a graphic im- sion of the surroundings among which they were

SOME EXTRA VERSES.

"Now we're stranded in Mesopotamia,
It's a beautiful country I swear (yes swear),
The sandstorms, so cool and refreshing,
Recall fogs in Lei—ces—ter Square."

Chorus—

"Wrap me up in my old leather jacket,
Pull my flying cap over my brow, my brow,
I'm wanting to fly home to 'Blighty,'
I wonder who's kissing her now (bow-wow)."

"The Arab's a greedy old heathen,
His wives he can count by the score, the score,
He covers their heads up with blankets:
You can't get a glad eye, O Lor."

"A wily old cuss is the Turco,
Samarrah he felt he could spare, could spare,
He ratted, when we got to work O,
And left us *this Paradise fair*!"

"A job I'd despise is the Sweeper's,
He makes dust wherever he goes, he goes,
It gets in your mouth and your peepers,
Its not a nice job for the nose."

"The Bhistie's a better class nigger,
He bring's us the water we drink—yes drink!
Don't offer us fizz, beer or whisky,
Tigris water is nicer we think."

"The Rigger's a kind patient fellow,
He fits on new axles galore, galore.
His language sounds *homelike* and *in flow*,
When fetching new 'V' struts from Store."

"The Fitter has painstaking manners,
Your engine won't rev., then he weeps, he weeps,
He'll coax her all night with his spanners,
Next day she's O.K. (Revs in heaps)."

"The old R.E.8 is a wonder,
In aeroplanes she's the last word, last word,
You open her out—gee by thunder,
She hops off the ground like a bird."

"Umpty-Third" Squadron, Mesopotamia, December, 1917.

THE MORE SERIOUS SIDE.

So much for the lighter side. Now we come to another phase altogether, that is the feeling of the chap who is going on leave, and really needs a rest. Despite the levity of the words, one gets the idea of the tired feeling beneath the levity :—

LEAVE.

When you're going on leave
In a couple of days,
Your heart pit-a-patters so lightly;
Then you grab your reprieve
And you think of the plays,
That others have spoken of nightly.
But you dread that you'll go
On some beastly old show,
The world then looks drab and unsightly;
So you pray all you know,
That the clouds will be low:
The sun you hope won't shine so brightly
And you sulfer such pain,
When there's no sign of rain;
Your voucher you clutch, Oh! so tightly.
That is how you go on,
'Till the time comes along,
When on leave you trot off so sprightly.

B. N. K. S.

Finally, here is a little verse, which one submits to serious critics as genuine poetry :—

WHY?

Softly some thousand feet below,
The flares dart up, blaze out and fall,
The hideous ground, transformed by snow,
Looks pure for once beneath its pall.
The sea of sky, fretted with stars,
Lies limp'd 'neath the pallid moon,
The heavens bend and breezes croon
O'er this sick world, its unhealed scars.
From wood and swamp the whole land round,
Where hate and lust and death abound,
Drifts back the cry :—" How long, and Why ?."

B. N. K. S.

The writer is an active-service pilot who has done much good work. Like all thinking people, he regards war as waste, but that does not prevent him from seeing the good done by war. The question, "How long, and Why?" is one which millions are asking. For most of us the answer to the first question is simply, "Till we win," and to the second, "Because all our friends are in it." But below that one feels that the world in general, and England in particular, was slipping away into sloth, and self-indulgence, and ease which was disease, so that it needed war to clean its system and to show the value of manhood over money.

THE RANK AND FILE.

The Rank and File also cultivate their allotments on Parnassus. Here, for example, is one effort by a former air mechanic, R.F.C., who has already published sundry booklets of verse :—

THE ADVENTURES OF ALGY.

When Algy, young and strong and fit,
And madly keen to do his bit,
Stepped out at Farnborough Station
To join the Royal Flying Corps,
He clenched his hands and stoutly swore
He'd win a reputation.

The brilliant pattern of his hose
Quite startled all the N.C Os.,
And threw them in a panic;
They biffed him, stood him on his head:
"Oh, what a funny freak!" they said—
"A Super Air-Mechanic!"

Next day, dear Algy was equipped;
He grasped his cane, and gaily tripped
Along the public byways;
And all the folk of Aldershot
Stared hard, and said, "We like him not,
Although he has some spry ways!"

They placed him in the S.R.O.
But Algy said he'd rather go
And to the stars pay homage;
He much preferred an aeroplane,
And so they posted him again
Forthwith, to Castle Bromwich.

There, Algy smashed a Sopwith Scout,
And knocked the Aerodrome about;
The Colonel's words were bitter;
"Get out," he growled, "you comic thing!"
And Algy, to another Wing
Went off as Wireless Fitter.

He did not take to "Volts" and "Amps,"
And, after strafing sundry lamps
With most refreshing vigour,
He found himself en route for Wye,
Where, Algy said, he'd have a try
To be a first-rate Rigger!

But Algy, down at his R.S.,
Got things in such a ghastly mess
He wasn't worth a stiver;
So they re-mustered him again,
"Aha!" said he, "my course is plain—
I'll be an M.T. driver!"

The casualties began to swell
Among the Squadron's personnel,
For Algy was a terror;
And those who travelled in his Ford
And came through safely, thanked the Lord,
And marvel'ed at the error!

And now, in Orders, one may read
The rank, the number, and the breed
Of Air-Mechanic Huggins;
His trade is stated, too, I trow,
Perchance he still pursues it now—
A "Miscellaneous Muggins"!

G. R. S.

One seems to have met the A.M. of that type, ev in civilian employ. The "Miscellaneous Muggin who is put onto jobs of all sorts because he is no gc at anything is a constant trouble to Squadron and Pa commanders. Incidentally the type persists even in t commissioned ranks. One finds him plentifully in t Hotel Bolo, for example, sometimes with brass rou the peak of his cap, sometimes with only "two fing up"—as rude people call the wound stripes on the c band which in the R.A.F. signify a captain. Th seems a chance for some inspired allotment cultiva to do something equally adequate about the type officer who always manages to avoid going on act service, although he is no use at home.

As a companion to "Algy" one ventures to crib t following touching lines from "The Highflyer," wh is the House Journal of a well-known seaplane firm

THE ROYAL NAVAL ALL SORTS.

THE TRIALS OF A RATING ON LEAVE.

I tell yer what it is you chaps this is a rummy game,
It doesn't matter where we go it's all along the same.
We're always took for something else, though I'm no bloc
ing Saint,
It isn't always funny to be took for what you ain't.

We's the Royal Naval All Sorts, that's just the name for us
It's a dollar to a hayseed if I jump aboard a 'bus
Some old lady grabs a hold of me and hollers in my face,
" 'Ere! stop this 'bus at once young man, you've took me p
my place."

I might be going home some night along a quiet street,
Some youngster's sure to take me for a special on his beat
" Farver's come 'ome drunk and knockin' muvver on the 'e
Please come and lock up farver while I put the kids to bed.'

" Go home and tell your mother that I'm not a special cop
I'm a Naval Air Mechanic, and I've no desire to swop.
If your father's took to combing out your mother of a night,
Tell her to fetch the sergeant, he'll comb father out all right.'

One day I took a notion for to go and see the Zoo.
I went into the monkey-house beside the cockatoo.
An old gentleman was passing by, he went too near the cage,
When a monkey seized him by the coat and tore it in a rage

He turned round to me and said: " Here keeper this won't d
" I'm not the bloomin' keeper," I replied, " but who are you
He said he was a member, so I went off there and then
To try and find the keeper who released him from his den.

It isn't always quite so bad as that I'm glad to say.
I was going down from Paddington by train the other day,
When just about to take a seat and settle down to smoke,
I saw a smart young lady with a much excited bloke.

A newly married couple, and they took me for the guard,
This time I meant to play the part, it wasn't very hard.
I found an empty carriage and I told them to get in.
They tipped me half a dollar and I gave a knowing grin.

I said I'd warn the passengers it was a mental case.
" If anyone comes near the door just make a slight grimac
I hopped it then for sure my camouflage was not the best.
But they were so pre-occupied they never would have guesse

I hear they're going to dress us in sky blue and stream-l
caps.
That ought to suit us very well we're such good looking chaps
'Twill almost end our camouflage, the public to deceive.
There's only one thing left and that's a French poilu on lea
" THE PHILISTINE."

So many of the former R.N.A.S. mechanics are st in pseudo-naval costume, and still "go ashore in Nu ber Ones" from a "ship" which is fifty miles from t sea, in a "leave boat" on four wheels, that one c still sympathise with their little troubles arising fr being mistaken for everything except what they are



"THE AWAKENING."—(Without apologies to the late Lord Leighton.)

FEMININE HELP.

Even those charming ladies who inhabit Government offices in their thousands, and appear to have little to do except look charming and make tea, have their own allotments. A highly esteemed feminine correspondent, who has had a brief, very brief, experience of a Government office, writes :—

"I am not, and hope I never may be, absolutely *idle*, but I felt I was not educated up to Government methods. Of course, it has its humorous side, but when one thinks of all those thousands of people paid to do practically nothing—and do it overtime as well—while men are having their homes and businesses broken up to go and have their poor, comic heads blown off for 1s. a day, it is enough to turn one into a Hyde Park ranter, or a poetess." Hence the following" :—

WAR WORK.

One day—one blissful day it was in flaming June—
Vain, idle dreams I wove : fanned by an infant breeze,
Sweetly I snoozed and drowsed—from sordid cares immune—
Lulled by the lapping tide, the softly rustling trees.

"What!" you exclaim : "'tis thus you fritter golden hours
While England cries for all our best in thew and brain?
The Sprite of Bloody War upon our country glowers?" . . .
Oh, stem your wrath, I beg : oh, let me, *please*, explain!

A verdant couch I sought not on the river's marge
In slothful mood, shunning the strife of vulgar mob.
Ah, no! I prayed for *work*, and, to a building large
On the Embankment I was lured—a Gov'ment job!

Brightly at 10 a.m. I took my seat obsessed
With thoughts of occupation new, but, as each hour
Dragged slowly on t'wards Angelus I grew depressed,
And lack of entertainment bred a temper sour.

I sat—a plaintive sight—among a concourse mixed
Who bandied jests and quips—(old men and maidens, too),
I, with my dwindling hopes on work no longer fixed,
Happy as Daniel closely caged in local Zoo!

One day—*one* blissful (?) day it was in flaming June
I watched the misty shadows by sweet sunbeams cleft.
But Conscience with this soporific life was not attune :
Two hours for lunch : a long-protracted tea—*I left!*

There you have an energetic and brainy woman's view of how things are done in some Government offices. Judging by examples which one knows, she is not far wide of the mark, and as her verses were written actually from personal experience they may be taken as photographically accurate.

As an antidote one gives the following as illustrating the effect on the non-mechanical female mind of too much purely technical work. Considered as a nightmare, it is even worse than that of the Flight-Commander already quoted. The metre goes out and loses itself at times, the rhymes on occasion simply don't, and the sense is about what one would expect from a nightmare, but in some quaint way it retains a connected narrative :—

THE RESULTS OF OVERWORK.

A DISTURBED NIGHT.

(February 15th, 1918.)

My Pillows (Pilot's Cushions)
And Minimum Stock Sheet,
Control lost and turnbuckled,
Top Cover Skid complete.

Palm-cradled in a nightmare,
My Eyebolts strange sights view,
By sleep's Propellers wafted,
My nightmare airship flew.

The Radiator Shutters
(With Brackets all complete),
I thought were kicked asunder
By mighty Engine Feet.

I thought a Bristol Fighter,
All armed with Bombs and Guns,
Came flying through the window,
Mistaking me for Huns.

A Royal King-Post followed,
With Struts across the floor;
The Fighter flew to smash him,
Top Ribs flew out with gore.

I screamed for help; A Stern Post
Leaped in with Compound Spring,
And, followed by his Gun Mounts,
Who also Streamlined in.

The Gun Mounts shot the Fighter,
And then in accents rough,
They called for Washers, Special,
And swore at the Blast Trough.

They bathed the King-Post's bruises,
And soon a Fabric band,
Stays Vertical his Top Ribs,
And slings his Starboard hand.

To Port they fly to cheer him,
His Pipes Exhaust to Pump,
His Air Relief relieves them.
He eats the Plug and Sump.

A Bell Crank next came tripping,
Her hair was like a Bush,
Her eyes like Springs and Flash Tubes :
She gave her Nut the Push.

The Nut with Jaw-Ends grinding,
And grasping sharp Rock-shaft,
Her Throttle clave asunder,
And stabbed her fore and aft.

Then flew in Judge and Jury,
Cross Members, Cross Heads all;
The Jury said, "Not guilty,"
The Judge put Cap on Ball.

The Jury yelled, "Not guilty!"
"The Nut was Screwed," they bawled,
They swore the Bell was cranky,
And rightly overhauled.

The Jury flew for Petrol,
And fetched an Aldis Sight,
And piling heaps of Wood Parts,
They set the Judge alight.

The Judge then called his Doggie,
A splendid Sopwith Pup,
He saw his Master singe-ing—
Forked Ends of flame flew up.

The Pup flew at the Jury,
And with a burning Log,
And C.C. Gear, he fired them,
Then ate them (dirty dog).

My Sockets (Hinge), unbolted,
Loud crowed a Petrol Cock,
Flops down my nightmare Airship,
I waken with Spring Shock.

E. M. M. Y.

Last but by no means least of the feminine helps the R.A.F. (pending the coming into being of t W.R.A.Fs.) are the female fitters in various workshop both "trade" factories and the Royal Aircraft Establis ment, as it is now called to distinguish it from t R.A.F. of the Royal Air Force. Here, then, is the so of the workshop :—

THE LAY OF THE FEMALE FITTERS.

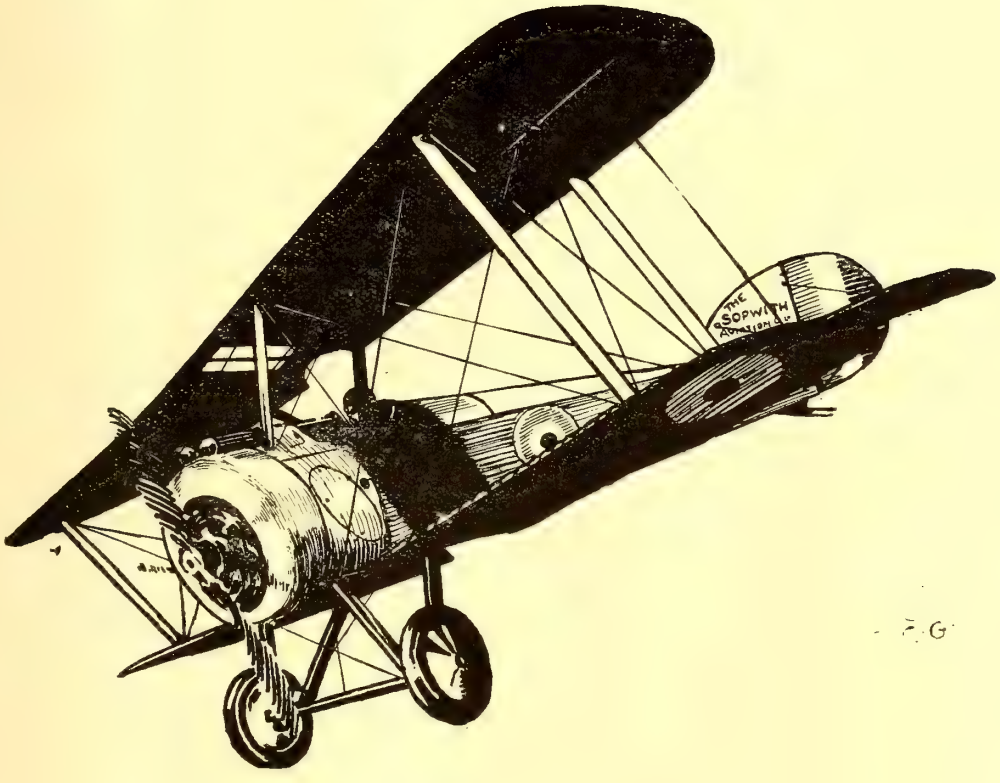
From A to Z, from Z to A,
This is the Female Fitters' lay.

A is for Aeroplanes, little and big.
B stands for Bending, with hammer and jig.
C is the Caps that we all hate to wear—
D is for Drills—I have broken my share.
E's Electricity, making things hum—
F is for Female—called "lady" by some—
G is the Grumblers, of whom we've no lack—
H is the Huns we are helping to whack.
I is the Industry shown by us all.
J's for the Jobs—there's not one but will pall.
K stands for Kasein, with horrible smell,
L is for Labourer—Lunch-time as well.
M is the Metal we cut up and file.
N is the Noise we make—frankly, it's vile!
O is for Overtime—most of us stop.
P is to Punch, or, colloquially, "pop."
Q is the Queer things that some of us do.
R's for the Rumours that seldom are true.
S is the Scamper at scund of the bell.
T's for the Tools that we handle so well.
U is our Usefulness—truly, it's great!
V's for the Visitors coming in state.
W's Windows we quarrel about—
X is the Xcellent work we turn out.
Y—(Yes, You're right—this is positive rot!)
Z is the Zeal that we have—or have not.

From Z to A, from A to Z,
The F. F.'s lay is finished.

E.

THE SOPWITH



AVIATION COMPANY, LIMITED
KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

Paris Office:
21, RUE DU MONT THABOR.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

A workmanlike little job, is it not? Certainly not poetry, but at any rate it scans and rhymes, which is something in these days of *vers libre* and futurist poets, and vorticists and so forth. A good mechanic is better than a medium artist any day of the week, and the mechanism of the lines is so good that one feels sure that the writer is quite a useful workshop hand.

THE REAL THING.

Some day possibly a major poet will arise who will sing of the aeroplane and its doings as my friend "Klaxon" sings of the King's Ships and the men of the King's Navy. One pictures "Klaxon," as one reads him, standing on the bridge of a destroyer doing a steady 35 knots in the teeth of a 50-knot North-Easter, his Hyacinthine locks streaming in the gale, while all around him resounds like a cosmic Aeolian harp. Not otherwise, surely, can "Klaxon" get his inspiration. Yet one believes that his most uplifting lines are written when sitting on the mud, fathoms deep at the bottom of the North Sea, in the chlorinic atmosphere of an overdue submarine, scratching his head partly for ideas and partly to drown the noise of sweepers' chains draggin along the skin of his ship, and that the rythmic thro of his majestic metre is really produced by the bum of *Vernon* "duds" as they bounce along her sides.

So perhaps the true prophet of the air in poetry ma be merely a bald-headed Equipment Officer, inspired b the song of his engines on test, or the chatter of lathe in his squadron workshops. Perhaps he may be worried Staff Officer who will write the real thing as a antidote to filling up innumerable forms which mea nothing but help to keep unnecessary brass-hats in thei jobs. It is extremely unlikely that the real thing, th ultimate orchid of poetry of the air, or even the rose i full bloom, will come from a pilot or an observer o the active list, though it may come from either afte he has been laid out permanently. Still there is n harm in their trying to produce it. Meantime, rathe than most of the sloppy stuff which has been publishe by way of being poetry, one prefers the plunder of th comic allotment-holders on Parnassus which has appeare hereinbefore.—C. G. G.

THE DEATH OF CAPT. PIERRON.

Much regret will be felt at the death of Capt.-Aviateur Pierron, of the Service d'Aviation Militaire, of France, who was killed on June 12th, along with his passenger, Lt. Rousseau, by the fall of their machine on the aerodrome at Hounslow, when they were within a quarter of a mile of their destination, after flying from France.

Eye-witnesses of the accident state that the machine was approaching Hounslow at about 8.30, flying steadily, and giving no indication of trouble. It had glided to within about 250 feet from the ground when it suddenly dipped, turned on its side, and dropped like a stone to earth. When the onlookers reached the spot both men were dead.

It is stated that on a previous journey an engine defect forced a landing, in the course of which the tail of the machine, Capt. Pierron's old familiar "Horace" Farman, was damaged. Capt. Pierron is said to have bent the damaged part straight with a mallet, and to have continued his journey. It is therefore assumed that the bent portion broke at the moment when the pilot opened up his engine to land, and at the same time operated his elevator, after a long glide. The eye-witnesses' account of what happened agree with this hypothesis.

Capt. Pierron was immensely popular with all the Flying Service people with whom he came in contact. For something like three years he has been a technical liaison officer between the French and British Services, and in that work he flew regularly between Paris and London. He always used the same old Farman, with a de Dietrich-built engine, and his average during the summer months must have been one return trip per week.

He was before the war a well-known motor manufacturer, and a famous balloonist. His wit—which was equally keen in French or English—and his goodness of heart won for him host of friends in this country, and his death removes one who has done great work in building up and maintaining that excellent working alliance which exists between the technical branches of the Allied Flying Services.

BAIRD AS A BUFFER.

From the "Star" of June 5th:—

Major Baird, M.P., has informed a questioner that in the matter of the aviation park at Loch Doon no disciplinary action on the part of the Air Council is considered to be required. This will be interesting news to the taxpayer, who wants to know why £500,000 was spent on a site which had to be abandoned before it was ever used.

The taxpayer, to whose patriotism the Government is just now appealing in regard to investments, wants to know why a site was selected for a flying school at which no flying would be possible on half the days of the year. He wants to know who chose a site where the only place on which an aeroplane could land was a peat-bog. The man who set 3,000 men to lay 56 miles of pipes to drain that peat-bog ought to have some form of public recognition conferred on him. The man who first thought of laying a second railway and constructing a tunnel through 1,150ft. of hard rock at an extra cost of £150,000 for a traffic of four trucks a day has missed his vocation. It seems hard that the Air Board has not "decorated" these zealous public servants.

[It still remains to be proved whether the people who chose Loch Doon were more to blame than the people who condemned it. Anyhow, Major Baird had a hand in condemning it, so perhaps that explains his hitherto inexplicable decoration.—Ed.]

THE WILBUR WRIGHT LECTURE.

Considerable additional interest is given to the sixth "Wilbu Wright" Lecture, to be held by the Aeronautical Society c Great Britain on June 25th at the Central Hall, Westminste by the fact that the chair will be taken by Sir William Weir Secretary of State for the Air Ministry.

Dr. W. F. Durand, who is to give the lecture, is one of th principal authorities on aviation in the United States. He i chairman of their National Advisory Committee for Aeronautics and Scientific Attaché to the American Embassy in Paris Dr. Durand's subject will be "Some Outstanding Problems i Aeronautics," which will be discussed quite non-technically.

Applications for tickets, which are already in great demand should be made to Mr. W. Barnard Faraday, the Secretary c the Society, 7, Albemarle Street, W.1.

A FINE ITALIAN PERFORMANCE.

The "Times" correspondent writes on June 13th that tw Italian pilots have flown 500 miles to Friedrichshafen and back and have taken excellent photographs of this German aeria stronghold, returning unharmed.

This flight to Friedrichshafen and back is among the longes non-stop flights made during the war. The record is still held b Sous Lt. Marchal, the French pilot, who, in June, 1916, left Franc for Russia and was actually within 60 miles of the Russian line when he was obliged, owing to engine trouble, to land. Durin the flight he passed over Berlin and dropped leaflets. He travelle about 811 miles, mostly at night.

Capt. de Beauchamp and Serjt. Gallois have to their credit th flights which rank next to Lt. Marchal's in distance. Capt Beauchamp in September, 1916, and Serit. Gallois on July 6th-7th 1917, dropped bombs on Essen, the distance covered on the doubl journey being given officially as 500 miles. The first-name officer also flew to Munich on Nov. 16th, 1916, and afterward landed at Santa Dona di Piave, near Vicenza, Italy, after cross ing the Alps. The distance covered in this flight was 437½ miles

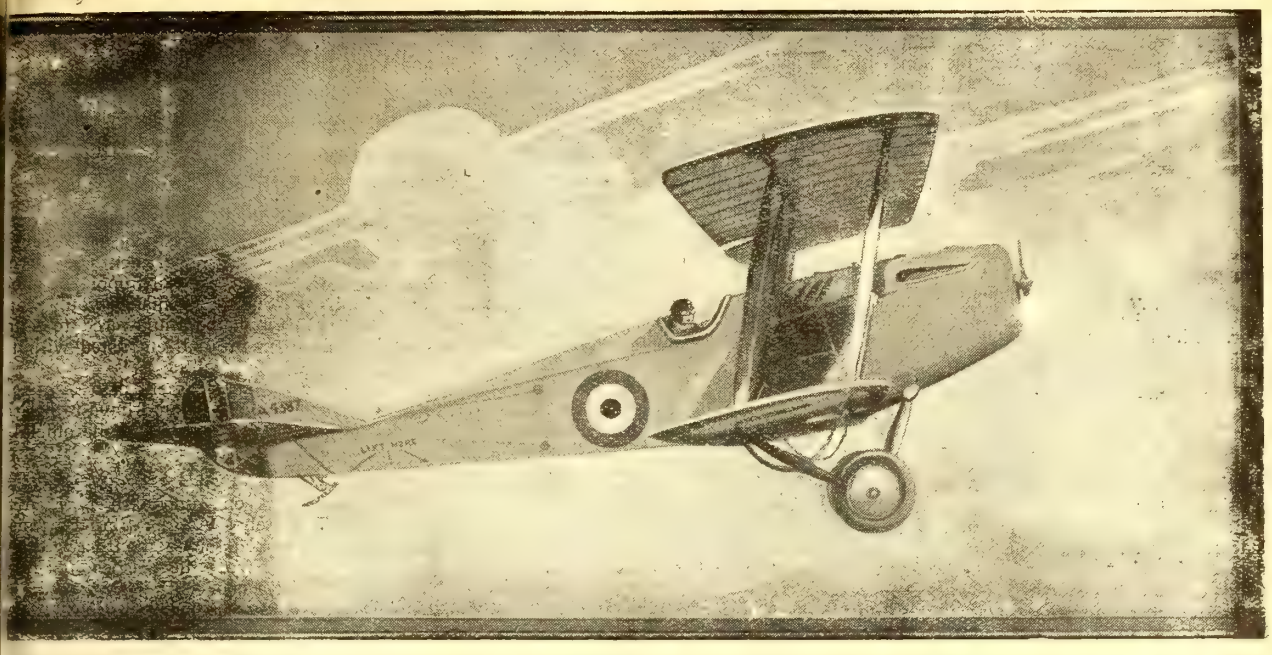
The record journey made for a hostile purpose is the fligh of 2,000 miles from London to Constantinople, which was mad by Sqdn. Comdr. Savory, R.N.A.S., on a Handley Page biplan with Rolls-Royce engines, in May, 1917, but this included severa stops.

Of the flights without warlike objective, the most remarkabl are those accomplished by Capt. Doctor Giulio Laureati, of th Italian Flying Service, who, in August, 1917, flew from Turin t Naples and back, about 920 miles, without a stop, and in Sep tember, 1917, for the first time in history flew from Italy t England (Turin to Hounslow), a distance of 656¼ miles, in abou 7½ hours.

It is well to recall that the first visit to Friedrichshafen wa paid by Flt. Comdr. E. Featherstone Briggs and Flt. Lts. Sipp and Babington, R.N., on Avros, with 80 h.p. Gnômes, in Novem ber, 1914, when the Zeppelin Factory was bombed and consider able damage was done to airships in process of manufacture.

CAPT. VON RICHTHOFEN.

"The Red Air Fighter," by the late Capt. Baron vo Richthofen, promises to be one of the best selling books of th year. The insight which it affords into German psychology an German methods appears to be highly appreciated by officers o the Flying Services, and at many aerodromes the book seems t have become practically a text-book. One hopes that the long introduction and the multitudinous foot-notes by the Editor o this paper assist in that direction.



The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds the World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE

Head Office

WOKING, Surrey.

A PROPOSED ENGINEERS' CLUB FOR THE MIDLANDS.

A representative meeting was held recently at the Chamber of Commerce, Birmingham, in connection with the project for forming an Engineers' Club in the Midlands.

In opening the proceedings the chairman, Dr. C. C. Garrard, M.I.E.E., remarked that in the future a great responsibility would rest upon engineers and upon all occupying leading positions in the engineering industry in connection with the work of reconstruction rendered necessary by the war. It was felt, however, that as a body engineers did not have the power corresponding to their abilities. This was no doubt due to their being so scattered and split up into a large number of organisations which had very little contact with each other. It was felt that the first thing to do to get over this state of affairs was for engineers and those associated with them technically to get together and to know each other. The result would inevitably be co-operative action, which would undoubtedly result not only in advantages to engineers themselves, but in great benefit to the country.

The idea underlying the organisation of the club was that it should offer all the advantages of a first-class social club, combined with facilities for meetings, lectures, etc. It was thus hoped that it would become the meeting place of the various technical societies in the district. Such a common meeting place for these societies had long been desired in Birmingham.

It might be added that the present scheme was part of a larger idea whereby such engineers' clubs would be founded in all the large engineering centres in the country. These, it was hoped, would eventually become federated together, so that members would not only have the practical advantages of the use of the club house in their travels, but the clubs would form centres of engineering activities in each locality.

A number of men connected with the industry have been elected to form a finance and general arrangements committee, and also a rules and propaganda committee.

Dr. C. C. Garrard, of the General Electric Co., and Mr. J. Fearn, of the Birmingham Small Arms Co., Ltd., were elected provisional chairman and honorary secretary respectively.

Mr. Fearn would be glad to get into touch with anyone interested in this project, and invites any such to communicate with him. Letters should be addressed to him care of the Birmingham Chamber of Commerce.

UNIFIED COMMAND.

The " Homme Libre " (M. Clemenceau's old paper), on June 16th, commenting on the collaboration of the British Air Force in the great battle, says :—

The units of the British Air Force employed on the battle front between Montdidier and Noyon are placed under the French command, from which they receive general fighting orders, the details of execution being left in the hands of the unit commanders. There is freedom of action on the one side and a spirit of initiative in the other.

The " Homme Libre " goes on to describe numerous exploits of British bombers and pilots, declaring that both did admirable work, in clearing not only the air of enemy machines but also the battlefields of the crews of the enemy batteries.

HOW THE MONEY GOES.

From the " Morning Post " of June 12th :—

The Comptroller and Auditor-General has been investigating the accounts of the Ministry of Munitions, and his report thereon has recently been published as a Parliamentary White Paper. The particular accounts in question relate to the transactions of the Ministry of Munitions with the National Factories and Roval Aircraft Factory, to which the Ministry supplies material.

The Auditor-General discovered that out of a total amount of over thirty-eight millions, representing the value of material supplied, over fifteen millions had not been invoiced, and of the rest the invoices were frequently incorrect. On the other side, the factory accountants had in many cases failed to keep accurate records, and in some instances the accounts were in such a state that it was impossible to check them. A trifling sum of three million pounds had gone astray altogether, but the Auditor-General states that it has since been identified.

His report, following upon the reports of the Parliamentary Committee dealing with the financial administration of the Munistry of Munitions, indicates a condition of affairs which has no parallel in English history. The Committee made certain recommendations to the Ministry, but according to their latest report these had been largely ignored.

While the Ministry of Munitions is expending many millions for which it produces either no vouchers at all or incorrect vouchers, other Departments stolidly and persistently block the supply of military requirements.

In war a thing is either required or it is not; and if it is required it is wanted at once. A long war, in fact, has a tendency to induce the lethargic habit of a long peace. Men subjected to a prolonged and a continuous strain cannot face the call to renewed initiative. Nevertheless, they must. Must is the word. And it is the business of the War Cabinet to replace tired men [illegible] men of fresh energies.

[There seems to be a hint hereabouts for those who are responsible for appointments in the Technical Department of the Ministry.—Ed.]

But there is another cause for that departmental procrasti[illegible] tion and departmental obstruction which breaks the heart of n[illegible] whose sole desire is to get things done for the country.

The new bureaucracy has inherited the fine old tradition of [illegible] Civil Service, which is the tradition of the Circumlocution Off[illegible] and whose essence is the quite definite avoidance of responsibil[illegible] Decisive action, initiative, a new departure, these things invo[illegible] responsibility. Someone perhaps must assume it, but it must [illegible] someone else.

We would therefore urge again, as we have urged before, [illegible] appointment of a Minister whose sole duty it should be to serve [illegible] a court of appeal and arbiter for all departments concern[illegible] matters which, important in themselves, are not important enou[illegible] to submit to the War Cabinet. Such a Minister would be [illegible] deputy of the War Cabinet, and would be empowered to enfo[illegible] the working together of all departments and entrusted with th[illegible] supervision.

[There is much to be said for the appointment of a Minister [illegible] Acceleration, but to make him effective he would have to be gi[illegible] plenary powers over the life and death, at any rate the official [illegible] and death, of Government servants.—Ed.]

A CONVICTION.

At a court-martial at Devonport on June 14th Maj. Art[illegible] Fincham Oxborrow, R.A.F., lately Actg. Staff-Paymas[illegible] R.N.R., was ordered to be imprisoned for 12 months, with h[illegible] labour, and dismissed with disgrace from the Service, for fals[illegible] ing accounts to the extent of over £900.

AN EXAMPLE FOR OTHERS.

At a Metropolitan police court on June 14th Charlotte W[illegible] a married woman, was fined £1 for failing to notify the find[illegible] of a height gauge belonging to an enemy aircraft which [illegible] been brought down by gunfire.

MORE BAIRD BLUNDERING.

On June 13th Maj. Baird said that experiments with parach[illegible] had been and were being made for use in flying, but the g[illegible] majority of accidents occurred in circumstances in which [illegible] kind of parachute would not be available.

This statement was made in reply to a question by [illegible] Morrell, who said he put it in view of the fact that in [illegible] nearly 800 pilots had been killed while training in this coun[illegible]

Maj. Baird on that point said that the number of fatal fl[illegible] accidents was much smaller than the figures quoted.

[It is, of course, true, that in the *majority* of accidents a pa[illegible] chute would not save life, but there are many, very many, ca[illegible] occurring constantly, both at home and at the front, in wh[illegible] parachutes would save life. Such cases are those in wh[illegible] tails or wings or controls break in the air, and especially cases[illegible] fire. Quite apart from the actual saving of life, the knowle[illegible] that such a form of lifebuoy existed on an aeroplane would s[illegible] many a man's nerve for long periods. Parachutes and meth[illegible] of fitting them exist. The only thing which hinders their us[illegible] the obstinacy of people in the Technical Department, who do[illegible] little flying that they cannot understand the feelings of regu[illegible] fliers in this or in any other of their needs, and men like t[illegible] Major Baird, who knows next to nothing himself, and is cont[illegible] simply to defend his department and keep his job without consi[illegible] ing the men on whose behalf he is supposed to be speaking[illegible] C. G. G.]

HONOURS.

(From the " Sunday Times," June 9th, 1918.)

When I perceived this morning
The host of names adorning
The Honours List (Department O.B.E.).
I was seized with apprehension
They'd discover some pretension
To rope me in, and do this thing to me.

The Honours List is swelling
So greatly, there's no telling
But they'll introduce conscription for recruits;
Comb out the population,
And force the decoration
On ev'ry man they think the honour suits.

H. R. M.

THE W.R.A.F.

On June 15th the " Penguins " moved their general inqu[illegible] office from Wellington Street, Strand, to their new headquarters [illegible] Mason's Yard, Duke Street, St. James's, W. The enrolment [illegible] " mobile " women commences next week, and the immediate [illegible] mands are for cooks, waitresses, and domestic workers. Appli[illegible] tion forms may be obtained from any employment exchange [illegible] from the above address, but written applications and correspon[illegible] ence should be addressed to the employment exchange nearest t[illegible] applicant's home.

CONGRATULATIONS.

FLETCHER.—On Wednesday, the 12th inst., at 42, Cavendi[illegible] Road, N.W.6, to Ida Mary (née Harper), wife of Anthony [illegible] Fletcher—a son (Anthony Douglas Martin).



CELLON

(NON-POISONOUS)

DOPE

CELLON LTD.,

22, CORK STREET, LONDON, W.1.

Telephone—GERRARD 440 (2 lines). Telegrams—"AJAWB, REG, LONDON."

Contractors to H.M. Government.

RECONNAISSANCE AND AERIAL SUPREMACY.

BY HENRY FORESTER.

" . . . Surprise lies at the foundation of all undertakings without exception, only in very different degrees, according to the nature of the undertaking and other circumstances . . . secrecy and rapidity are the two factors in this product."—Von Clausewitz, " On War," Vol. I, Bk. III, Chap. IX.

Lt.-Col. Repington, writing in the "Morning Post," on June 9th last, said that the German Higher Command were rightly pleased with their success in the concealment of concentrations in the days and weeks before the launching of an offensive. He said also that the increased fever for duelling in the air among present-day pilots should not blind them to the true reasons for such fighting—the prevention of adequate aerial reconnaissance by the enemy and increased security for reconnaissance aeroplanes of the Allied Forces.

The essence of successful war throughout the ages has been the infliction of the unexpected attack on forces or defences not properly prepared for resistance. Chivalry ordains that individuals must awaken their opponents before killing them, but nations and armies are less sensitive in action. All advantages must be taken in war provided that dishonourable stratagem is left aside.

Preparedness.

There is scarcely a victory in history, either on land or sea, which was not the result of greater prevision and preparedness on the side of the victor. In 1870 the Franco-German War had ceased in so far as effective fighting was concerned before France had overcome the initial unreadiness of her Army and Navy. Paris was beleaguered before the Imperial Government had succeeded, despite frenzied haste, in supplying their troops with sufficient boots for current use.

As in stratagem so in the tactical field success lies with the determined forces acting with swift precision and certainty, even against greater numbers and greater metal. It is not only consistent preparation before a war and in the wider spaces of hostility that leads to victory, but in the sphere of tactical operations also. Not even the slightest operation in the field can be carried out without preliminary work. Ill thought-out plans and insufficient care in the pre-arrangement of movements are the most constant sources of "unfortunate incidents" in war.

The Advantage of Attack.

In the attack the preparation of operation orders depends entirely on the knowledge of the enemy dispositions at the disposal of the General Officer Commanding the attacking troops. He must know the composition of the troops opposite to him, i.e., from what part of the civilised globe they are drawn. He must know a little of the psychology of the enemy general and his staff. The main outlines of the defences must be familiar to him, and he must, above all, know the disposition of enemy reserves. Yet, with all that, he is not so much at the mercy of intelligence as is the defending force.

The attacker has many advantages. He chooses the field of battle, and opens operations at a time suitable to himself. In face of unexpectedly strong resistance at one point he can divert the weight of his attack to other less well-defended points. As he is able to begin hostilities he is also able to end them. His artillery, moreover, are firing on targets of which the registration is perfect, and which do not change. The defender, on the other hand, has to fire on moving targets, the importance of which vary widely from moment to moment.

The attacking force, in addition, can concentrate the mass of its means of reconnaissance on the sector at which he proposes to open battle. He is not greatly concerned with happenings on other parts of the front as if his offensive attains a proper degree of success all intended moves of the enemy elsewhere become relatively unimportant.

The Disadvantage of Defence.

The defence is always at a disadvantage. It is an unhappy fate to be passive in war. Success in war, it cannot be too often repeated, can only be attained by vigorous action.

No war has yet been won by a consistently defensive attitude any more than war can be waged profitably by the speeches of politicians, however loaded they may be with masses of ill-informed vituperation. None has yet stopped the pastime of murder or the business of burglary by telling the murderer and the burglar that they are very bad men.

The Need for Knowledge.

The defence, amongst other disadvantages, must maintain a careful reconnaissance at all points of the defended front, from the strongest to the weakest sectors. It is not enough to watch carefully those places at which the enemy may be expected to attack. The skilled enemy rarely does the obvious.

Sir George Colley, a soldier of distinction, turned Majuba into a defeat because he failed to defend the steepest slope of the hill. He under-estimated his enemy's intelligence, and paid for this breach of elemental principle, the greatest and last mistake of his career, with his life. The strongest points need the most careful watching and defending, as on them depends the integrity of the line.

No attack can be made without elaborate preparations, especially under the somewhat peculiar conditions prevailing in the present war. The attacking troops must be brought to the point at which it is prepared to open the offensive. The number of guns in this area must be increased greatly.

Additional roads are necessary in order that troops and supplies may readily be brought up in support as the offensive proceeds. Ammunition must be dumped in large quantities in readiness for the battle. And, with all this, it is necessary that the enemy shall be kept in ignorance of all that is happening in the chosen sector.

Preparation for Advance.

Movements in the trench systems at present popular in war tend if successful, to increase the length of the front in a manner unknown in any other of the many forms of war. Therefore, victory makes necessary the employment of greatly increased numbers. Not only must the gains made be consolidated, but every preparation must be made to defeat the counter-attack which has become a common feature of operations.

Advances, and all attacks in strength which are intended to end in advances, involve the employment of numerous detachments of technical troops in the repair and construction of roads, railways, bridges, trench systems, and so on, all of which must be carried out with great speed.

Modern Reconnaissance.

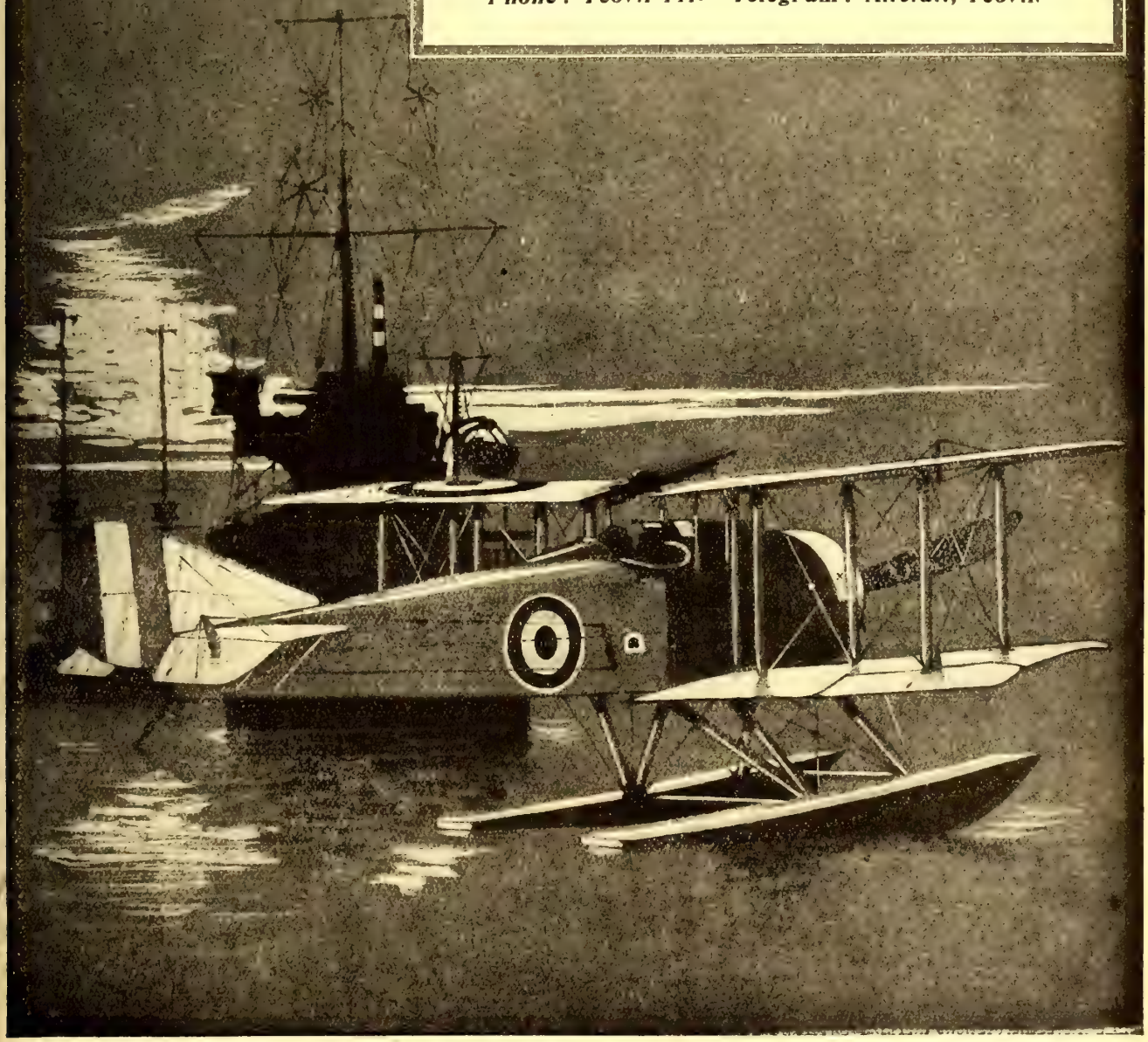
In former days, before the operations of war descended from the high estate of spacious disposition to the

WESTLAND Aircraft.

BRANCH OF PETTERS LIMITED.

YEOVIL.

Phone: Yeovil 141. Telegram: Aircraft, Yeovil.



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

pettiness of an illimitable siege, information was gained in countless ways, principal among these being the cavalry screen. In the earlier stage of the present hostilities the main source of information was drawn jointly from aviation units and from the cavalry. Practically speaking, all ground work has now ceased, owing to the prevailing conditions, and the only reconnaissances of value are made by units of the Royal Air Force.

The recent offensives carried out by the enemy would appear, from such information as has been issued to the public, to have contained elements of "surprise" in the military sense of the word. There is little doubt that on two occasions the attacks made were unexpected, otherwise the disposition of reserves would have been different. If it can be admitted that "surprise" attacks on a large scale similar in initial form to that made at Cambrai by General Byng, late last year—that is to say, without a long period of the intensive artillery preparation which naturally lessens the surprise—one must be permitted to wonder how far our claim to the "supremacy of the air" is justified by events.

The Limits of Camouflage.

Such attacks cannot be made without preliminary preparation, a large proportion of which must in the nature of things be visible from the air. The art of "camouflage," greatly though it has progressed since the beginning of the war, is yet unable to disguise a landscape, recently entirely altered, in such a manner as to make it represent itself when young. The decrease in guns and works can be disguised, but a vast increase cannot be hidden from the trained eye of the experienced aerial observer.

The actual bringing up of troops and material must be carried out under cover of night, that as little suspicion as may be shall come to the enemy. Yet even so the concentrations should leave traces visible to the aerial patrol. It would therefore seem that Col. Repington is right in saying that the increase in air fighting is affecting the execution of really serious work.

The Reason for Air Fighting.

The reason of aerial fighting is not that joy may come to the aerial duellist, nor that he shall find an easy road to the acquisition of merit. It is not a self-contained art existing for itself alone.

Aerial fighting should be directed against machines carrying out routine duties for the army. Supremacy in the air implies that the Power possessing it is able to prevent enemy scouts or spotting machines from passing over ground held by their opponents.

Unfortunately it has become the habit for fighting machines to seek out other fighting aeroplanes rather than to chase the working machines. No mistaken feeling of sportsmanship should prevent pilots from attacking and destroying reconnaissance aircraft.

The fighting pilot should not forget that the only reason for his existence is to protect his own scouting machines and to destroy those of the enemy.

There is little doubt that the true duties of the fighting aeroplane have of late been forgotten to some degree, and it is possible that inadequate protection has been given to Allied reconnoitring aircraft.

One does not imply necessarily that the British aerial forces are at fault, for it must not be forgotten that we are but one of twenty-four Allies, and our resources are apparently not capable of managing or assisting to manage the warlike efforts of more than about twenty of that faithful band. But, be the reason what it may, there is little question that the Allied strategical intelligence has failed to some degree of recent months.

Night Reconnaissance.

There is another element in this question of preventing military "surprise." It is clear that if reconnaissance by day, of whatever intensity it may have been, has failed to reveal the general drift of enemy intention it will be necessary (it may be done at present, and may always have been done) to carry out nightly tactical and strategical reconnaissances by aeroplane.

The concealment given to an army by the darkness of the night is not entire. It is true that little can be seen of movements by night from aeroplanes flying at a height of five thousand feet or more, yet if pilots go out with the special intention of observing enemy movements by night, and fly sufficiently low, they will see any large moves that may be in course of execution.

Troops cannot move in large bodies at night without some manner of lighting. Trains cannot assume, either by day or by night, the mantle of invisibility. The long columns of motor transports, now an essential of war, is outlined to the watcher above by even that little amount of light that is permitted to each wagon.

If the enemy hear the approach of aircraft, then all movement must at once cease. The cessation of movement is one of the desired objects of the visiting pilot. Even if they are unable to detect movement of an unusual size, they will have achieved a purpose of value if, even unknown to themselves, they have prevented the progress of the enemy's plans for an hour or two.

There is little doubt that on the average night a pilot flying at a height of one thousand feet can see much of what is happening below. If the roads are crowded with troops, he cannot fail to see them, and the secrets of the railway are of no less a degree visible to him.

The Beauty of the Obvious.

In order to get definite results, however, pilots must go out over the chosen sector at intervals throughout the period of darkness. Otherwise troops will scatter and lights will be extinguished during the brief period of the reconnaissance and all may be missed. If observation is made continuous, the enemy will cease to try and avoid it. He realises with singular rapidity the useless in war, and is not above learning from experience.

It is possible that such deliberate night reconnaissance may be a habit with the Allied Forces abroad at present but, if so, it is a little hard to understand the lack of knowledge of what the enemy proposed to do in each of the last three offensives. Certain of his moves followed so clearly the great accepted principles of strategy that intention should have supplied that knowledge which reconnaissance apparently failed to believe.

There can be no harm in indicating the obvious, even in the twentieth century, and the necessity of night reconnaissance and of the intelligent use of fighting aircraft are both obvious.

RIBBONS FOR AIR FORCE DECORATIONS.

It is officially stated that the colours of the ribbons of the new Air Force decorations and medals are as follows:—

Distinguished Flying Cross.—Purple and white.

Air Force Cross.—Red and white.

Distinguished Flying Medal.—Purple and white.

Air Force Medal.—Red and white.

The ribbon will in all cases be worn so as to show a coloured band at the top.

EFFICIENCY IN THE AIR MINISTRY.

The "Morning Post" of June 12th states that Sir Arthur Roberts, K.B.E., F.C.A., who recently resigned his position in the Air Ministry, has rejoined the Department in an honorary capacity as Chief Auditor of Works Accounts. At the time of his resignation Sir Arthur refused to make any statement.

Mr. Bertram H. Jones, who was reported to have resigned at the same time and for the same reason as Sir Arthur Roberts, is also back at the Ministry.

AIRCRAFT MANUFACTURING COMPANY——————LIMITED

Contractors to

War Office and Admiralty

London Office
27, BUCKINGHAM GATE, S.W.1.

And at
HENDON, N.W.9.

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."

Telephones:
3906 BRISTOL
(Private Branch Exchange)



NAVAL & MILITARY AERONAUTICS



GEOFFREY WATSON

FROM THE "LONDON GAZETTE."

The King has been pleased to confer the Medal of the Most Excellent Order of the British Empire on the following persons for services in connection with the war, in which great courage or self-sacrifice has been displayed. The awards are dated June 3rd :—

Gardner, James, Ex-Air Mech. L., R.N.A.S., for courage and presence of mind in extinguishing, at great personal risk and with difficulty, a fire on a loaded ammunition lorry.

Tilley, Harry, Ldg. Mech., R.N.A.S., for courage and presence of mind in preventing an explosion at great personal risk.

* * *

The King has been graciously pleased, on the occasion of His Majesty's Birthday, to give orders for the following appointments to the Most Excellent Order of the British Empire, for services in connection with the war.

MEMBERS (M.B.E.)

Hawker, Harry George, Esq., Trade Pilot, Sopwith Aviation Co., Ltd.

Hills, Maj. John Harris, Staff Officer, 2nd Cl., R.A.F.

Hinchliffe, Robert, Esq., Chief Draughtsman, Messrs. Armstrong, Whitworth, and Co.

Holloway, Maj. Reginald, Staff Officer, 2nd Cl., R.A.F.

Jackson, Mrs. Margaret Lilian Cowper, Admin. Asst. Supplies (Aeroplanes), Aircraft Production Dept., Min. of Munitions.

Kenyon, Thomas, Esq., Asst. Manager, Gun Mounting Dept., Messrs. Armstrong, Whitworth, and Co.

Kirby, George Clarvis, Esq., Manager, Wood-working Dept., Messrs. Ruston, Proctor and Co., Ltd.

Krabbe, Maj. Charles Frederick, Staff Officer, 2nd Cl., R.A.F.

Lawson, Lt. Harold, Officer-Clerk, R.A.F.

Leith, Maj. Thomas Geoffrey, Aircraft Production Directorate and R.A.F.

McCrae, Maj. James, Commander of an Aircraft Acceptance Park, R.A.F.

Middlemas, Lt. Percy, Gunnery Officer, R.A.F. (Machine Guns).

Miley, Maj. Arnold John, Aircraft Production Directorate and R.A.F.

Millar, Maj. Exley Livingston, Controller of an Aeroplane Repair Section in the Field.

Maxwell-Muller, Percy, Esq., Works Manager at one of the establishments of Messrs. Vickers, Ltd.

Nicholson, Lt.-Col. Malcolm, Staff Officer, 2nd Cl. R.A.F.

Parkin, Maj. James Edward, R.A.F., Recruits Training Depot.

Plaister, Maj. William Edward, Staff Officer, 2nd Cl., R.A.F.

Prentice, Capt. William Francis, Technical Officer, R.A.F., and Directorate of Aircraft Production.

Prince, Capt. Charles Edmond, Wireless Experimental Officer, 1st Cl., R.A.F.

Pryor, Mrs. Ethne Philippa, Hon. Sec., Prisoners of War Dept, R.A.F. Aid Committee.

Raikes, Capt. William Oswell, Staff Officer, 2nd Cl., Training Divn., R.A.F.

Rowe, William George, Esq., Assistant Shipyard Manager, Messrs. J. S. White and Co., Cowes.

Savage, Maj. John Clifford, Staff Officer, 2nd Cl., R.A.F.

Scott, James, Esq., Dep. Asst. Inspr. of Aeroplanes, Aeronautical Inspection, Ministry of Munitions.

Semmons, Lt. Foster James, Anti-Aircraft Defences, Home Forces.

Seymour, Frank, Esq., Dep. Asst. Inspr. of Aeroplanes, Aeronautical Inspection, Ministry of Munitions.

Smale, Bertram Haylock, Esq., Dep. Asst. Inspr. of Aeroplanes, Aeronautical Inspection, Ministry of Munitions.

Songhurst, Capt. Fred Hibbard, R.A.F., in charge of Workshops in an Overseas Aircraft Park

Sorby, Miss Gertrude Vera, Administrative Asst., Supplies (Aeroplanes), Aircraft Production Dept., Ministry of Munitions.

Spencer, John Hayward, Esq., Dept. Asst. Inspr. of Aeroplanes, Aeronautical Inspection, Ministry of Munitions.

Stagg, Maj. George Ernest, Staff Officer, 2nd Cl., R.A.F.

Strother, Lt. Cyril John, Technical Officer (Wireless Duties), R.A.F.

Thesiger, Capt. the Hon. Percy Mansfield, R.A.F., conducting an Equipment Branch in the field.

Vanneck, Lt. Arthur Percy, Anti-Aircraft Defences, Home Forces.

Whitfield, Capt. Frederick Ernest Banister, R.A.F. (Wing Adjutant).

WAR OFFICE, June 11th.

REGULAR FORCES—ESTABLISHMENTS—R.F.C.—MIL. WING.—Sqdn. Comdrs.—And to be temp. Majs. while so empld. :—Temp. Capt. S. S. Halse, Gen. List, from a special appt. (graded as a Flt. Comdr.), Dec. 16th, 1917. From Flt. Comdrs. :—Temp. Capt. E. R. Manning, M.C., Gen. List; Lt. (temp. Capt.) H. B. Prior, Spec. Res.; Capt. A. S. Redfern, R.W. Surr. R., T.F.; Capt. (temp. Maj.) L. P. Aizlewood, M.C., York and Lanc. R., T.F., from a Chief Instr. (graded as a Sqdn. Comdr.), School of Aerial Fighting, and to retain his temp. rank while so empld. From Flt. Comdrs., and to be temp. Majs. while so empld. :—Lt. (temp. Capt.) H. F. Champion, Rif. Brig., Spec. Res.; Lt. (temp. Capt.) R. W. Heath, Spec. Res., Jan. 1st. Capt. J. O. C. Orton, Norf. R., Feb. 9th. Temp. Capt. H. S. Powell, M.C., Gen. List, Feb. 18th. Lt. (temp. Capt.) W. E. Collison, Spec. Res., Feb. 20th. Lt. (temp. Capt.) H. A. Wood, M.C., Spec. Res., March 1st. Capt. (temp. Maj.) W. A. Bishop, V.C., D.S.O., M.C., Canadian Light Horse, from a Chief Instr. (graded as a Sqdn. Comdr.), Schools of Aerial Gunnery, and to retain his temp. rank while so empld., March 13th, seny. Aug. 28th, 1917. From Flt. Comdrs., and to be temp. Majs. while so empld. :—Lt. (temp. Capt.) A. C. Wilson, Lrs., March 16th. Capt. G. C. Pirie, M.C., Sco. Rif., Spec. Res., March 25th. Sec. Lt. (temp. Capt.) A. Coningham, D.S.O., M.C., Spec. Res., March 26th.

* * *

The following are mentioned for gallant conduct and distinguished services rendered during the period from September 21st, 1917, to February 28th, 1918, in a dispatch which has been received by the Secretary of State for War from Lt.-Gen. G. F. Milne, K.C.B., D.S.O., Commander-in-Chief, British Salonika Force :—

ROYAL AIR FORCE.

Booth, Lt. C. (formerly Gen. List); Boss, Lt. P. A. A. (formerly Gen. List).

Davis, Maj. J. O., M.C. (formerly Gen. List); Dawes, Lt.-Col. G. W. P., D.S.O. (formerly R. Berks. R.).

Ellen, Temp. Obsr. Sub-Lt. C. N.

Gardner, Capt. G. D., M.C. (formerly York. R., T.F.); Gates, Sec. Lt. H. J. (formerly E. Kent R.); Gibbs, Lt. G. E., M.C. (formerly Gen. List); Gimingham, Lt. (Temp. Capt.) C. H., R.F.C. (died of wounds).

Hodge, Lt. and Hon. Capt. M. (formerly R.F.C., S.R.).

Jones, Sec. Lt. J. S., M.C. (formerly R.G.A., S.R.).

McBain, Lt. (Temp. Capt.) W. R. B., M.C. (formerly R.F.A., T.F.).

Riley, Lt. H. (formerly Gen. List).

Saunders, Lt. (Temp. Capt.) F. G., M.C. (formerly Gen. List).

Smith, Capt. C. H. (R. of O., R.F.A.), attd. R.A.F.

Travers, Lt. F. D. (formerly Herts. Yeo., T.F.).

Dawe, 3751 Serjt. A.; Ewell, 5519 Flt. Serjt. H. F.; Finch, 8457 Flt. Serjt. W. H.; Griggs, 45039 1st A.M. (Actg. Corpl.) F. T.; Guerin, 43618 2nd A.M., J. W.; Reeve, 29991 Serjt. W. L.; Shepherd, 7697 Flt. Serjt. W.; Sprot, 5650 Serjt. R.; Steadman, 4388 Corpl. J. C.; Wilkinson, 21631 2nd A.M., E.; Williams, 4705, Serjt. T. E.

AIR MINISTRY, June 11th.

R.A.F.—The following temp. appts. are made at the Air Ministry :—Staff Officer, 2nd Cl.—W. E. Jones (Maj., L'pool R.), and is granted a temp. commn. as Maj., vice Maj. E. G. Mackenzie, May 21st.

Staff Officer, 3rd Cl.—Lt. (temp. Capt.) H. H. Walmsley, and to retain his temp. rank whilst so empld., vice Lt. (temp. Maj.), P. C. Simmons, May 25th.

The following temp. appts. are made :—

Staff Officer, 1st Cl.—Lt. (temp. Capt.) W. O. Raikes, and to be temp. Lt.-Col. whilst so empld., April 1st.

Staff Officer, 2nd Cl.—Capt. C. C. Darley, and to be temp. Maj. whilst so empld , May 21st.

Staff Officer, 3rd Cl.—J. F. Myles (temp. Capt., Sea. Highrs.), and is granted a temp. commn. as Capt., May 5th.

Flying Branch.—The follg. Capts. to be temp. Majs. while empld. as Majs. (A. and S.) :—C. J. W. Crichton, Lord G. H. L. Dundas, J. B. Elliott, A. W. Keen, M.C., H. H. Kitchener, G. H. B. McCall, H. J. Seagrave, April 1st; A. S. C. Maclaren, M.C., April 9th; E. Henty, April 19th; C. B. Cooke, April 20th; A. C. Hagon, April 26th; E. N. Clifton, E. L. Foot, M.C., A. C. Horsbrugh, April 30th; E. B. Beauman, M. S. Marsden, R. D. G. Sibley, May 1st; T. F. N. Gerrard, D.S.C., May 30th; L. L. Maclean, June 5th; E. de C. Halifax, June 10th.

Lts. (temp. Capts.) to be temp. Majs. while empld. as Majs. (A. and S.) :—A. Durston, G. J. King, R. S. Lucy, P. R. Meredith, H. T. Shaw, J. K. Waugh, April 1st; R. W. Gow, D.S.O., D.S.C., April 7th; C. J. Q. Brand, M.C., April 19th; S. E. Adams, April 21st; C. E. M. Pickthorne, M.C., H. G. Smart, April 30th; C. T. Freeman, D.S.C., A. F. F. Jacob, May 1st; C. C. R. Edwards, D.S.C., May 13th; R. C. Hardstaff, May 27th; G. Knight, M.C., June 5th.

Capt. (Hon. Maj.) G. G. H. Cooke to be temp. Maj. while empld. as Maj. (Dir.), June 3rd.

Lts. (temp. Capts.) to be temp. Majs. while empld. as Majs. (Dir.) :—R. A. Cochrane, J. B. Cole-Hamilton, April 1st; I. C. Little (substituted for notification in the "Gazette" of May 28th); G. M. Thomas, R. S. Booth, May 14th.

Lt. (temp. Capt.) B. C. Windeler to be temp. Maj. while empld. as Maj. (K.B.), May 22nd (substituted for notification in "Gazette," June 4th).

Lts. to be temp. Capts. while empld. as Capts. (A. and S.) :—R. J. Elliott, April 1st; N. S. Beswick, May 23rd; J. Weaver, June 1st; F. W. Burdick, W. S. C. Smith, C. Sutherand, June 4th.

Lts. (Hon. Capts.) to be temp. Capts, while empld. as Capts. (A. and S.) :—P. A. F. Belton, E. D. Crundall, D. F. Fitzgibbon, D.S.C., H. F. Stackard, May 10th; G. H. B. Wilson, M.C., May 22nd; A. H. H. Gilligan, May 26th; W. H. S. Aplin, B. C. H. Cross, S. J. Fetherston, J. L. Gordon, G. R. Hodgson, June 1st.

Lts. (Hon. Capts.) to be temp. Capts. while empld. as Capts. (Dir.) :—F. L. C. Butcher, E. K. H. Turnour, June 3rd.

The following are granted temp. commns. as Sec. Lts. (A. and S.) :—H. S. D. Woolley, J. Priestman, April 1st; L. H. Holmes, April 3rd; C. Jackson (Lt., R. Welsh Fus., T.F.), and to be Hon. Lt., April 5th; E. C. Baines (Lt., Ches. R., T.F.), and to be Hon. Lt., April 8th; R. F. Lee (temp. Capt., E. Lan. R.), and to be Hon. Capt., April 9th; J. Christie (temp. Lt., Sea. Highrs.), and to be Hon. Lt., April 10th; W. Lee (temp. Lt., R. Ir. Fus.), and to be Hon. Lt., April 12th; J. Wallace (temp. Sec. Lt., attd. R. Highrs.), April 13th; F. L. Bamber (temp. Lt., R. War. R.), and to be Hon. Lt.; R. H. Corren (temp. Lt., R.E.), and to be Hon. Lt.; J. R. Orton (temp. Lt., Ches. R.), and to be Hon. Lt.; L. J. Pugh (temp. Lt., Gen. List), and to be Hon. Lt.; F. H. Johnston (temp Lt., G. Bn., Northd. Fus.), and to be Hon. Lt.; J. S. Arthur, M.C. (Lt. R.F.A.), and to be Hon. Lt., April 14th; K. E. Wright (Sec. Lt., R.F.A., Spec. Res.), April 15th; W. C. G. Cribbett (Lt., Lond. R., T.F.), and to be Hon. Lt., April 16th.

Temp. Lts., Obsr. Officers, to be temp. Lts., A. and S. :—J. Hawke, W. Steer, April 5th; O. W. Jones, April 8th; J. B. M. Barnum, April 9th; B. S. Alexander, E. M. Pocock, F. P. Adams, April 14th; J. J. St. L. Martin, S. Seed, April 16th.

Temp. Sec. Lts. (late General List, R.F.C., on prob.), to be confirmed in their rank as temp. Sec. Lts., A. and S. :—L. F. Mead, April 3rd; S. Leigh, April 5th; H. V. Evans, A. Roberts, F. A. Vandenberg, April 6th; C. C. A. Leppan, April 7th; V. J. W. G. Shaw, April 8th; R. Lane, G. B. Murray, April 9th; W. Comb, C. H. Philipp, April 10th; F. J. Brunton, April 12th; H. Rowlands, April 14th; A. C. Lamb, J. Groves, J. T. O'Brien-Saint, April 15th; A. Cairnie, April 16th; O. C. Roberts, April 17th; A. St. C. O'Leary, April 18th.

The follg. Prob. Flt. Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lts. (A. and S.) :—S. H. Bazeley, G. C. Crowley, R. McI. Gordon, J. H. Grierson, N. V. Grimsditch, V. H. Hervey, W. B. Hughes, W. E. Ingram, R. E. Kestell, E. R. Lawson, A. C. Mann, J. H. Mesham, C. R. Moore, J. H. Sprott, C. E. V. Taylor, J. M. Wilson, C. C. Woods, April 3rd; J. E. Wood, W. B. Craig, April 4th; C. G. Abel, C. P. Sparkes, G. M. Hughey, J. Wooding, E. MacK. Faris, J. F. L. Wood, L. J. French, April 5th; K. W. J. Oldridge, H. C. Mills, April 20th; W. A. Foot, April 21st; A. C. Davis, R. A. Yates, A. M. Sutherland, R. N. Hesketh, H. A. Pank, L. H. Nesbitt, M. F. McGregor, V. S. Grigg, G. Heath, L. V. Nicol, C. F. Mossman, A. T. Cross, A. C. Lloyd, J. R. A. Barnes, I. H. Grabousky, April 24th; A. MacG. Anderson, April 29th; H. G. Sullivan, D. L. Melvin, P. R. Hale, C. B. Kempson, V. W. Morecroft, V. Vickers, R. A. H. Hamilton, A. C. G. Fowler, H. C. Petch, W. H. Paxman, R. H. Haworth-Booth, May 1st; H. C. Margrett, May 2nd; H. A. Haines, V. W. Lamb, May 3rd; H. Thomas, May 6th; G. M. Roberts, E. Colmer, May 7th; B. C. Dupont, A. V. Britnell, G. W. Wilson, R. W. C. Waugh, J. C. Leggett, A. R. Padmore, C. V. C. Wright, T. H. May, G. H. Range, C. F. J. Lisle, K. C. Gorringe, K. W. Jones, D. M. Matthews, E. C. Toy, R. C. Harley, J. H. C. Wake, May 8th; A. H. Partner, A. E. Ash, A. M. Stevens, J. A. Porter, J. B. Cunningham, H. E. Cooper, B. Sykes, May 10th; S. G. Burgess, J. E. Greenwell, C. H. J. Holden, May 12th; H. H. Hill, May 14th; F. Jardine, A. C. J. Anderson, W. R. Souter, E. J. Wing, G. F. Dupuy, V. Croome, May 15th; P. H. Maskell, May 16th; D. A. Roberts, J. E. Gow, A. H. Greatrex, May 17th; R. M. Morris, R. L. Pallett, May 19th; J. H. Gibbons, May 20th; F. S. Hall, H. L. Marshall, May 21st; V. T. Lloyd-Davies, L. J. Spence, May 22nd; A. C. Kermode, E. M. Ackery, L. F. Hill, O. H. Young, L. A. Lewinton, May 23rd; A. L. Hunt, C. S. Davis, R. S. McCall, J. A. Munn, D. C. Prodger, May 24th; W. C. Parker, May 25th; P. R. Clare, L. Poulter, May 29th; J. H. McCaghey, May 30th; W. D. Redmond, May 31st.

The follg. Prob. Flt. Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lts. (K.B.) :—D'A. B. Recordon, A. W. T. Chudley, C. A. Howe, J. Maclelland, April 26th; A. H. Barber, H. D. Wright, B. R. A. H. Davies, E. V. Henderson, L. A. Hill, C. H. Ratcliffe, N. Howl, April 27th; C. H. Beech, May 1st; A. N. Burningham, W. H. Gladwin, W. E. Sulway E. S. Eilley, R. S. L. Levi, E. C. James, G. B. James, B. I. Beal, J. K. Loud, May 3rd.

F. A. Barley (Sec. Lt., R.G.A., Spec. Res.) is granted a temp. commn. as Sec. Lt. (K.B.), May 27th.

Temp. Lt. H. G. Hall (A. and S.) to be temp Lt. (Obsr. Officer), May 7th.

W. Anderson, M.C. (Sec. Lt., R.G.A., Spec. Res.), and is granted a temp. commn. as Sec. Lt. (Obsr. Officer), May 16th.

Capt. H. G. Kaye relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Capt., June 12th.

Lt. F. J. Martel resigns his commn., and is granted the hon. rank of Lt., May 26th.

The follg. Lts. relinquish their commns. on account of ill-health contracted on active service, and are granted the hon. rank of Lt. :—G. R. James, L. M. Williams, June 12th.

The follg. Lts. relinquish their commns. on account of ill-health contracted on active service :—E. N. D. Barr, M.C. (R.F.A., Spec. Res.); C. W. P. May, M.C. (R.I. Regt., Spec. Res.); F. B. O'Dowd (Middx. R., T.F.), June 12th.

Lt. J. A. Ainscow resigns his commn. to resume his medical studies, and is granted the hon. rank of Lt., June 12th.

Lt. G. T. F. Hunter relinquishes his commn. on account of ill-health, and is granted the hon. rank of Lt., June 12th.

Lt. L. L. Grant resigns his commn., June 12th.

The initials of C. O. Rusden are as now described, and not as stated in "Gazette," June 4th.

Administrative Branch.—A. W. C. McFall (Maj., Hon. Lt.-Col., ret. pay) is granted a temp. commn. as Maj. and to be temp. Lt.-Col. while empld. as Courts-Martial President, May 6th.

H. Perry (temp. Capt. in Army) is granted a temp. commn. as Maj., April 15th, but with seny. from April 1st. (Substituted for notification in "Gazette," May 3rd.)

G. G. Gold (Maj., Essex Yeo., T.F.) is granted a temp. commn. as Maj., May 30th.

P. J. Whitty (Capt., R. Ir. R.) is granted a temp. commn. as Capt. and to be temp. Maj. while empld. as Maj., May 21st.

The follg. are granted temp. commns. as Capts. :—L. F. Colebrook (temp. Capt., R. Lanc. R.), April 18th; A. Ridley (Qrmr. and Hon. Capt., Lond. R.), May 23rd.

E. D. Shearn (temp. Lt., Hamps R.) is granted a temp. commn. as Lt. and to be temp. Capt. while empld. as Admin. Capt., May 9th.

Lt. (temp. Capt.) G. C. Bateman retains temp. rank of Capt. while empld. as Capt. on reversion from Staff Officer, 3rd Cl., June 1st.

To be temp. Capts. while empld. as Capts. :—Sec. Lt. J. R. Bingham, April 18th; Lt. L. T. Beddow, May 13th.

The follg. to be Admin. Lts. :—T. M. Goldon (from Obsr. Lt.), N. A. Hardie (from A. and S. Lt.), April 18th.

Sec. Lt. T. P. Pritchard to be temp. Lt. while empld. as Lt., May 20th.

W. N. Sloan (Capt. Sco. Rif.) is granted a temp. commn. as Lt. and to be Hon. Capt., May 23rd.

J. S. Stooke-Vaughan (Sec. Lt., R.G.A., Spec. Res.) is granted a temp. commn. as Sec. Lt. and to be temp. Lt. while empld. as Lt., May 28th.

Lt. (temp. Capt.) W. P. Archer relinquishes his commn. on acct. of ill-health, and is granted the hon. rank of Capt., June 12th

Lt. E. Duveen relinquishes his commn. on acct. of ill-health

contracted on active service, and is granted the hon. rank of Lt., June 12th.

The follg. Sec. Lts. relinquish their commns. on acct. of ill-health, and are granted the hon rank of Sec Lt. :—B. Holden, H. Ogden, June 12th.

The follg. Sec. Lts. resign their commns. :—C. M. H. Cordasco, W. J. V. Duncan, June 12th.

TECHNICAL BRANCH.—Maj. R. Hall to be temp. Lt.-Col. while empld. as Lt.-Col., May 1st.

Lt. (temp. Capt.) C. St. Noble to be temp. Maj. while empld. as Maj., May 1st.

Lt. C. J. Pender to be temp. Capt. while empld. as Capt., May 25th.

W. E. Jones to be Sec. Lt., from (A. and S.) Lt., and to be Hon. Lt., June 1st.

R. I. Wells (Lt., S. Staffs. R., Spec. Res.) is granted a temp. commn. as Sec. Lt. and to be Hon. Lt., May 29th.

The notification in "Gazette," May 7th regarding Sec. Lt. E. F. Cameron is cancelled.

MEDICAL BRANCH.—Sec. Lt. (temp. Capt.) G. W. Allen to be Sec. Lt. (from Tech. Branch) and to retain his temp. rank while so empld., June 3rd.

The follg. are granted temp. commns. as Lts. :—L. C. W. Balls, C. S. Dowdell, A. G. Hewer, R. Magliston, J. C. Smyth, R. A. Spong, H. L. Thorn, June 10th.

MEMORANDA.—Lt. C. R. Alston to be temp. Capt. while specially empld., June 11th.

The follg. relinquish their commns. on ceasing to be empld. :—Lt. S. L. Ward, April 8th; Capt. A. B. Johnson (Capt., Border R.), May 28th.

WAR OFFICE, June 12th.

REGULAR FORCES. — ESTABLISHMENTS.—R.F.C. — MIL. WING.—Equipt. Officer, 1st Cl.—Lt. H. Wing, Spec. Res., from the 2nd Cl., and to be temp. Capt. while so empld., March 31st.

* * *

The King has been pleased to approve of the awards of the Military Medal for bravery in the Field to the following non-commissioned officer and men :—

26216 1st Cl. A.M. R. N. Booth, R.A.F. (Dewsbury).
25272 1st Cl. A.M. B. O. Boundy, R.A.F. (Taunton).
4248 Flt. Serjt. C. F. Colin, R.F.C. (Chichester).
7966 1st Cl. A.M. W. J. Farr, R.A.F. (London, N.).
98930 2nd Cl. A.M. J. G. Glass, R.A.F. (India).

AIR MINISTRY, June 12th.

The King has been pleased to confer the Distinguished Flying Cross on the following officers of the R.A.F. :—

Lt. Edward Eric TURNER.

Whilst piloting his machine during a hostile air raid he displayed great determination and skill in manœuvring at a height of 11,000ft. under heavy enemy fire, which enabled his observer to bring effective fire on an enemy aeroplane, resulting in its being driven to the ground.

Lt. Henry Balfour BARWISE.

Whilst acting as observer to Lt. E. E. Turner on patrol duty, during a hostile air raid, he showed great courage and ability. Although exposed to severe fire from the enemy he took prompt advantage of the skilful piloting of his machine, which enabled him to bring effective fire on his antagonist, as a result of which the enemy aeroplane was badly damaged and forced to land.

WAR OFFICE, June 13th.

REGULAR FORCES. — ESTABLISHMENTS.—R.F.C. — MIL. WING.—Sqdn. Comdr.—Temp. Maj. S. E. Parker, Gen. List, from a special appt. (graded as a Sqdn. Comdr.), Feb. 12th.

Gen. List.—Serjt. E. A. Gay, from R.F.C., to be temp, Sec. Lt. March 23rd. (Substituted for notification in "Gazette," April 25th).

* * *

WAR OFFICE, June 14th.

The following are mentioned for distinguished and gallant services and devotion to duty in a dispatch which has been received by the Secretary of State for War from General Sir E. H. H. Allenby, G.C.M.G., K.C.B., General Officer Commanding-in-Chief, Egyptian Expeditionary Force :—

ROYAL AIR FORCE.

Adams, Capt. W. B.; Archer, Capt. (temp. Maj.) J. O. (frmly. R.F.A., S.R.); Atkins, Capt. (Hon. Maj.) W. R. G. (frmly. R.F.C., S.R.)

Baker, Lt. (temp. Capt.) A. H. S.; Boddam-Whetham, Maj. (temp. Lt.-Col.) A. C. (frmly. Lt., R. of O., A. and S. Highrs.); Brown, Lt. (temp. Capt.) F. G. (frmly. R.F.A.)

Chilton, Lt. T. (frmly. R.F.A.); Clogstoun, Lt. (temp. Capt.) H. P. S. (frmly. R.F.C., S.R.); Clarke, Capt. (temp. Maj.) E. E.; Collett, Lt. H. R. P.; Cresswell, Sec. Lt. (Hon. Lt.) K. A. C. (frmly. R.F.C., S.R.); Crothers, Capt. W. G. M. (frmly. Suff. R.); Cullen, Lt. Ian (frmly. Yeo.).

Dutton, Lt. F. F., M.C. (frmly. Ches. R.); Du Val, Lt. (Actg. Capt.) P. G. (frmly. Lond. R.)

Eiloart, Lt. G. M.

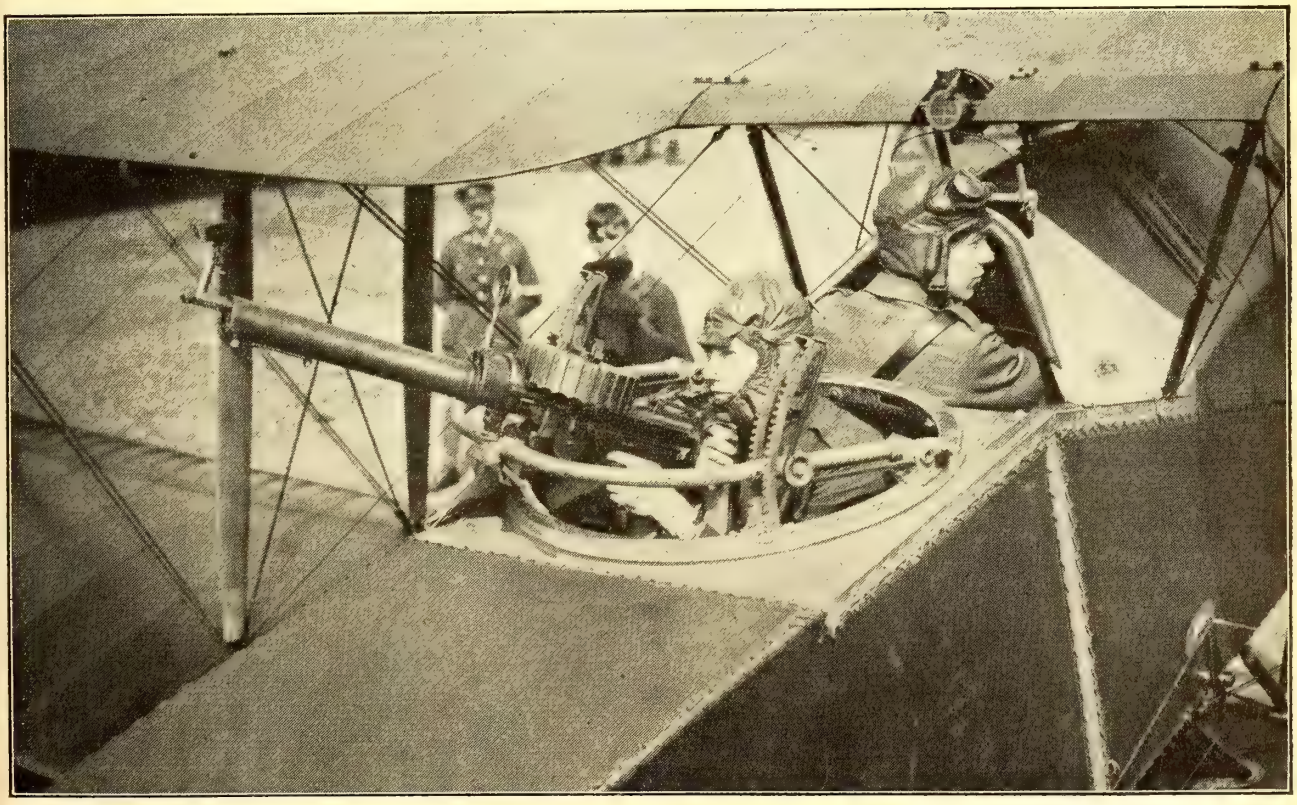
Fraser, Lt. W. T. (frmly. R.F.A.).

Goldsmith, Maj. (temp. Lt.-Col.) N. (frmly. R.A.); Graham, Lt. C. E. V., M.C. (frmly. R.F.A.; Graves, Capt. A. (frmly. R.E.); Gurney, Lt. A. R. (frmly, M.G. Corps).

Halcombe, Capt. (temp. Maj.) N. M. (frmly. R.E.); Haycock, Lt. H. (frmly. R.F.C., S.R.).

James, Sec. Lt. M. J. (frmly. R.F.C., S.R.); Jefcoate, (temp. Capt.) F.

Long, Capt. (temp. Maj.) W. D. (frmly. Gen. List); Low, Lt. J. B. (frmly. H.L.I.).



Official Photograph.

At the Observers' School of Aerial Gunnery, where officers go through their course of instruction. A pilot and observer ready to start for their firing tests in mid-air.

MacEwen, Maj. (temp. Lt.-Col.) N. D. K., D.S.O. (frmly. A. and S. Highrs.); Macrostie, Sec. Lt. R. D. G. (frmly. Gen. List); Massy, Capt. D. F. (frmly. Ind. Army); Martin, Lt. (Hon. Capt.) W. G. B., M.C. (frmly. Alberta R., Canadian Forces); Matheson, Sec. Lt. H. M. (R.F.C., S.R.) (died); May, Lt. W. J. (frmly. Cambs. R.); Medhurst, Capt. (temp. Maj.) C. E. H., M.C. (frmly. R. Innis. Fus.); Miles, Lt. F. H. H. (frmly. Yeo.)

Nicholls, Lt. R. C. (frmly. Bedf. R.).

Pargiter, Capt. (temp. Maj.) A. P., M.C. (frmly. R. Irish R.); Primrose, Maj. (temp. Lt.-Col.) W. H. (frmly. A. and S. Highrs.).

Rodney, Capt. the Hon. J. H. B., M.C. (frmly. R. Bde.).

Saunders, Lt. (temp. Capt.) H. L. (frmly. R.F.C., S.R.); Stent, Capt. (temp. Maj.) F. W. (frmly. R.F.C., S.R.); Stuart, Sec. Lt. T.C . (frmly. Gord. Highrs.)

Todd, Maj. (temp. Lt.-Col.) G. E. (frmly. Welsh R.).

Vaughan, Lt. F. S. (frmly. R. W. Kent R.)

Willock, Capt. (temp. Maj.) R. P.; Wood, Sec. Lt. W. F.; Wright, Capt. (temp. Maj.) A. C. (frmly. R.F.C., S.R.); Waite, Lt. R. B. (frmly. Yeo.); Watson, Sec. Lt (Hon. Lt.) J. C. R. (frmly. H.L.I.).

Adams, 3337 Flt.-Serjt. H. C.

Baldwin, 6332 Corpl. H.; Cattell, 49586 Corpl. (Actg. Serjt.) H. A.; Clark, 17071 Flt.-Sergt. S. O.; Cooke, 1000 Flt.-Serjt. G.; Curtis, 23398 Flt.-Serjt. A. S.

Dowding, 5044 Corpl. G. V.

Grimes, 391 temp. S.M. C. G.

Hall, 41491 Corpl. J.; Halliday, 26861 Flt.-Serjt. W.; Holmes, 12893 Corpl. R.

Jones, 28023 Corpl. J.

Leak, 68121 1/A.M. A. J.

Mendoza, 33553 Flt.-Serjt. W.

Newman, 67695 Corpl. R. J.; Nicholls, 103710 1/A.M. J. A.; Norton, 49715 Flt.-Serjt. F.

O'Driscoll, 6192 Serjt. J. P.

Philpott, 4075 Serjt. S. H.; Platten, 21460 Corpl. H. G.

Reed, 37666 Corpl. W. H.; Rackstraw, 36675 Corpl. F. L.; Ransome, 4893 1/A.M. H.; Rayner, 16324 Flt.-Serjt. R. W.; Roberts, 26818 Corpl. J.

Smith, 8030 1/A.M. C. A.; Swanston, 17582 Serjt. W.

Thompson, 30746 Corpl. W.

Vickerman, 6285 Serjt. T.

Watson, 4154 Serjt. R.; Wilkins, 7830 Serjt. T. P.; Williams, 35005 Corpl. G.; Winter, 2314 Flt.-Serjt. (temp. S.M.) C. L.; Woodcock, 32578 Corpl. T.; Wooley, 10151 1/A.M. (Actg. Corpl.) E. A.

Yates, 2454 Flt.-Serjt. T. M.

AUSTRALIAN IMPERIAL FORCE.

FLYING CORPS.

Jones, Capt. A. M., M.C.

Bennett, Aus./275 Corpl. J. M.; Chalmers, Aus./280 Serjt. J. E.; Dawes, Aus./384 1/A.M., C.; Kilburn, Aus./176 Corpl. (Actg. Serjt.) W. E.; Matulich, Aus./14129 1/A.M., L. C.; Reilly, Aus./316 Flt.-Sergt. R.; Thomas, Aus./158 Serjt. (Actg. Flt.-Serjt.) J.; Wadham, Aus./182 1/A.M., H. E.; Walford, Aus./330 Flt.-Serjt. B.

AIR MINISTRY, June 14th.

R.A.F.—The follg. temp. appts. are made at the Air Ministry:

Director.—Maj. (temp. Lt.-Col.) P. R. C. Groves, D.S.O., and to be temp. Brig.-Gen. whilst so empld, May 27th.

Chief Inspr. of Gymnasia (Staff Officer, 1st Cl.)—Capt. (temp. Lt.-Col.) E. G. H. Clarke, M.C., April 1st (substituted for the notification in the "Gazette" of April 2nd).

Asst. Inspr. of Gymnasia (Staff Officer, 2nd Cl.).—J. E. Speranza (temp. Maj.) and R.W. Surr. R., and is granted a temp. commn. as Maj., May 14th.

Staff Officers 2nd Cl.—Capt. (temp. Maj.) G. S. Peacock, April 1st; Capt. (temp. Maj.) N. Sladden, June 3rd.

Staff Officers, 4th Cl.—J. W. Hustwaite (temp. Sec. Lt., Labour Corps), and is granted a temp. commn. as Sec. Lt., and to be temp. Lt. whilst so empld., April 1st; Sec. Lt. E. G. Clement, and to be temp. Lt. whilst so empld., May 31st.

The follg. temp. appts. are made:—Staff Officers, 1st Cl., and to be temp. Lt.-Cols., whilst so empld.:—Capt. J. A. M. Lang, Lt. D. N. Thomson, M.C., April 1st.

Staff Officer, 2nd Cl.—Lt. (temp. Capt.) R. G. Mitchell, and to be temp. Maj. whilst so empld., April 1st.

Staff Officer, 4th Cl. (P.)—Lt. A. H. Goldie, April 6th.

FLYING BRANCH.—Maj. G. F. H. Faithfull to be temp. Lt.-Col. whilst empld. as Lt.-Col. (K.B.), June 3rd.

Capt. (temp. Maj.) L. F. Richard to retain his temp. rank whilst empld. as Maj. (A. and S.), April 9th.

Lts. to be temp. Capts. whilst empld. as Capts. (A. and S.):—(Hon. Capt.) C. E. S. Lusk, May 8th; W. J. A. Duncan, May 18th; G. E. Wait, May 23rd; (Hon. Capt.) A. W. Farquhar, May 27th; R. J. Dawes, (Hon. Capt.) C. B. Glynn, C. E. Howell, T. F. Williams, M.C., June 1st; H. J. Hunterf, June 2nd; R. O. Purry, June 5th; C. W. Busk, M.C., L. G. Wood, June 6th; H. S. P. Walmsley, June 7th.

Lt. (Hon. Capt.) B. E. Harrison to be temp. Capt. whilst empld. as Capt. (O.), June 8th.

The follg. temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts. (A. and S.):—H. M. Pasmore, M. de W. Bamberger, April 2nd; T. F. Kesterton, W. Endersby, April 4th; G. F. Birchard, C. H. Kayler, April 5th; A. C. Gray, T. E. Birbeck, April 6th; J. R. Fournier, April 7th; W. A. Macfarlane, W. J. Prangley, T. S. Gordon, N. Kirkpatrick, G. C. Macklem, April 8th; W. B. Tait April 18th; N. F. Hoxie, April 23rd; G. S. Reid, April 30th; J. Fulton, J. A. Gilchrist, May 2nd; J. Stewart, May 4th; R. C. Davies, E. H. Mulley, M.C. Brown, May 6th; P. B. Myers E. Barrett, May 7th; K. A. Nelson, H. Dabney, T. G. Hobbs G. W. D. Foggin, May 8th; V. S. Stevens, J. W. Cox, J. T. Potts, T. Buchanan, R. E. M. Milne, R. P. Bourne, May 9th F. J. Church, R. G. McLaren, P. H. Desarmeau, H. B. Oldham E. P. J. Hull, W. S. Murray, H. M. S. Parsons, M. N. Cloete W. S. Rycroft, May 10th, C. Dyson, G. Rogerson, D. C. Anderson, M. E. Bradley, C. H. Stephens, E. E. Bricknell, J. W. Ratcliffe, W. Sanders, A. F. Wallace, G. E. Davidson, R. Cookson, A. E. Holmes, D. R. Day, J. Macdonald, S. D. Blanchard, May 11th; J. Olorenshaw, J. V. Lind, W. F. Woodland, May 12th; A. J. Robinson, B. W. Hopkins, W. S. Greenwood, T. M. Ritchie, H. E. Cowley, E. H. W. Darley, E. V. Bond, E. J. Mulholland, A. C. S. Hawkins, C. D. Boothman R. O. Campbell, D. C. Childs, May 13th; G. C. S. Bowring R. G. Nicholls, F. E. Finch, J. S. Stringer, A. F. White, G. F. Bassett, J. Newhill, R. E. H. Goodhead, G. A. A. Le Moine L. F. Marshall, W. E. Hall, May 14th; W. R. Binch, May 16th

H. W. Stockdale (late temp. Capt., Gen. List, R.F.C.) to be temp. Sec. Lt., A. and S., and to be Hon. Capt., May 11th.

The follg. proby. Flt Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lts. (A. and S.):—C. H. Porter, C. B. Smith T. G. Stubley, J. T. Dupuy, May 28th; D. F. Martin-Smith W. R. S. Henderson, H. K. Russell, C. C. Crossley, E. S. McLeod, H. D. Morley, J. A. H. Pegram, J. Malcolm, B. L. Cook, C. Walker, G. B. Shillaker, J. G. Nash, W. W. McBain E. R. Hiscocks, J. F. Fraser, R. G. Nunn, B. Hearne, D. A. Colquhoun, F. J. H. Ayscough, T. N. Barling, S. Cox, A. W. Hardwck, May 29th; E. A. Eames, May 30th; R. A. Jacquot R. Shepperd, D. MacDougall, T. B. Simpson, E. R. Percival May 31st; G. K. Lucas, June 1st.

The follg. proby. Obsr. Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lts., Obsr. Officers:—C. J. T. Boys April 25th; W. M. C. Baber, A. Boyd, R. H. S. Calver, C. W. Dodds, J. Drake, G. P. Emery, J. G. M. Farrall, J. S. Harrison, F. Hopwood, M. E. Meredith, C. J. Smith, D. E. Spalton R. L. Stevenson, I. D. Stewart, G. B. Treadwell, J. C. Wallace May 6th; W. F. Gibson, May 17th.

The follg. proby. Obsrs. Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lts. (Dir.):—D. P. Davidson, R. W. Fosclee, H. D. Lane, H. F. Luck, H. W. Pickford, W. P. Bird, May 8th.

The follg. are granted temp. commns. as Sec. Lts. (A. and S.:—J. F. Clement (Lt., Alberta R., C.E.F.), and to be Hon. Lt., May 5th; L. Brown (temp. Lt., York and Lanc. R.) and to be Hon. Lt., May 6th; E. C. Hocking (Lt., R.F.A., S.R.) and to be Hon. Lt. R. W. Drewett (Sec. Lt., Lond. R., T.F.), May 8th. J. Donaldson (Lt., Sea. Highrs., T.F.) and to be Hon. Lt., May 9th; A. J. Thomas (Lt., A.S.C., Spec. Res.) and to be Hon. Lt., E. H. Umbers (Sec. Lt., W. York R., T.F.), May 10th; P. G. Clarabut (temp. Sec. Lt., attd. E. Kent R.), H. G. Bloodworth (Lt., R. E. Kent Yeo., T.F.) and to be Hon. Lt., N. D. Lambert (Sec. Lt., R.F.A., Spec. Res.), R. L. G. Wright (temp. Lt., R. Lanc R.) and to be Hon. Lt., A. J. Cyr (Lt., Can. Forestry Corps, C.E.F.) and to be Hon. Lt., May 11th; E. O. Scarborough (Sec. Lt., Lpool. R., T.F.), J. S. Nicoll (Lt., R. Highrs., T.F.) and to be Hon. Lt., P. McCaig (Lt., Scot. Horse, Yeo., T. F.) and to be Hon. Lt., A. M. Diamant (Lt., R.F.A., Spec. Res.) and to be Hon. Lt., May 12th; R. N. Hamilton (Lt., Bucks Yeo., T.F.) and to be Hon. Lt., J. H. Weatheriil (temp. Sec. Lt., attd. Ches. R.), W. Bonner (temp. Sec. Lt., attd. R. Lanc. R.), E. P. J. Touche (temp. Sec. Lt., Essex R.), May 13th; E. G. Gaff (Sec. Lt., R. W. Kent R., T.F.), S. Walker (Sec. Lt., Camb. R., T.F.), O. S. Brown (temp. Sec. Lt., attd. K.O.S.B.), May 14th.

The follg. are granted temp. commns. as Sec. Lts. (K.B.):—E. Nordberg (temp. Lt., A.S.C.) and to be Hon. Lt., April 1st; H. S. Starkey (Lt., Wilts R., T.F.) and to be Hon. Lt., May 29th; F. D. Wemyss (Sec. Lt., R.G.A., Spec. Res.), H. J. Palmer (Sec. Lt., R.G.A., Spec. Res.), May 30th

The follg. cadets are granted temp. commns. as Sec. Lts. (A. and S.):—P. H. Take, W. L. Dean, C. F. Kearns, April 1st; F. W. Tucker, April 3rd; R. M. Craigmyle, A. M. Allan, T. M. MacIntyre, C. A. Robotham, G. A. Ruffridge, H. D. Wilshire, H. G. Yerg, W. R. Maxwell, O. L. Nicholls, April 6th; W. L. Lanigan, April 12th; M. C. Abrams, G. K. Alling, W. Du Pre Arthur, Jr., H. Atherton, H. E. Bourke, F. H. Bellinger, A. E. Buckingham, H. C. Cook, L. F. Callaway, H. H. Gunther, A. F. Head, R. M. Herbert, N. G. Holtby, N. Jones, J. A. Mackay, F. D. McGuire, J. O. McLellan, F. T. Mollard, J. C. Morgan, F. Mulcair, W. M. Munshaw, J. A. O'Neill, C. G.

(Continued on page 2286.)

WOODSIDE ENGINEERING COMPANY, LTD.,
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 5456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW.

Registered Office
50 WELLINGTON STREET
GLASGOW.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co. Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

The Design and Construction of Internal Combustion Engines, with special reference to Aero Engines.—IX.

BY C. SYLVESTER.
Author of "The Conversion of Electrical Machinery," "Testing Motors and Motor Starters," etc., etc.

Testing.

The testing of an engine, whether oil or petrol, may be considered the most important operation since the commencement its erection, and tests should only be carried out under the pervision of an expert. An expert, in this sense, does not ean an expert in design and construction, but a person who, addition to understanding thoroughly the constructional tails, can tell by the behaviour of the engine whether it is nning correctly or not.

Tests of very large Diesel engines sometimes run over a period several weeks, that is, including the "running" prior to e official tests. Here it is essential that one person should pervise the whole of the running. Thus, he becomes quainted with the whole of the minor breakdowns that have curred, and he knows, to a certain extent, where the weakest rts of his engine are. Moreover, each engine has a peculiar te of its own, and the slightest change in this note will be tected by the supervisor, who as a rule will know what steps take to rectify any fault that may have developed.

Engine Test Beds.

It is important that engine test beds should be as strong as ssible. Here not only should the mechanical strength of the d be taken into consideration but the foundation should be ite as strong in proportion.

It is a common practice, when arranging the beds for large gines, to level the bed with iron wedges. These wedges are aced between the base of the bed and the concrete foundation, us allowing a very fine vertical adjustment. This method is od practice, providing that the bed is constructed with flanges the base to allow the grout, after levelling is completed, to tain a firm grip on the bed.

If the bed is not fitted with substantial flanges, then the levelling ocess should be carried out with long liners placed under the ges of the bed, the final adjustment being carried out by eans of long wedges which will have a maximum bearing rface.

Aero engine test beds are very small, and they usually vary in ape according to the type of engine to be tested. They are, a rule, made of stout cast iron.

However, concerning all types of test beds, it is most imrtant that they should be absolutely rigid, and as far as possible parate from each other. [One takes leave to differ from Mr. lvester on this point. An aeroplane engine never runs on a lid bed after it is taken off test, for an aeroplane is far from gid. Many an engine has done excellently on a test bed, and adly in an aeroplane because the test bed has given it the gidity which it lacked itself in its crank-case and bearers. herefore one is of the opinion that to obtain truly informative sts, the test bed for an aero engine should be made deliberately ringy.—Ed.]

A Curious Fact.

It may be rather curious to state that "All test beds should , as far as possible, separate from each other." From this is necessary to explain an incident that has occurred within ie writer's experience.

Two large oil engines were erected side by side on two separate ngine beds. After erection, the running in was commenced on ne engine for one day and was continued on the other engine ie following day. And, during the whole of the running in, ie two engines were never run together.

These engines were being built for a Government Department, nd the officials insisted upon the official tests of both engines eing carried out on the same day. The tests were of eight hours' duration, thus it became necessary to run both engines together. One engine was accordingly started up at 8 a.m., and it ran very nicely until noon, when the other engine was started.

The method of starting these engines was with an electric motor, and it was found that when two cylinders were firing, the engine was taking its own load, and the motor could be shut down.

In the case under consideration, when the second cylinder commenced firing, the engine that was already on test commenced to vibrate. So much so that the foreman in charge of the test began to run round the engine to try and ascertain what had happened. When the third cylinder on the incoming engine commenced firing, the vibration on the first engine was so excessive that it became necessary to shut both engines down. The first engine was again started and run up to full speed. The maximum load was placed on it and there was no sign of vibration. When the second engine was started up, the same thing happened as before—the vibration was excessive.

From this it was quite apparent that the running of one engine was affecting that of the other. It was therefore necessary to complete the test of each engine separately, which was done. [It would be interesting to know what would have happened if those two engines were installed in the same boat or submarine.—Ed.]

The Cause of the Trouble.

After both engines had been tested and were dismantled, it was decided to overhaul the engine-bed foundations to see if the cause of the trouble could be discovered. The cause was not far distant, for, after a few inches of concrete had been removed round the beds, it was found that both engine-beds had been laid across two stiff girders.

These girders ran the whole length of the two engines, that is, they were laid at right angles to the engine beds as illustrated in Fig. 34. Thus, the second engine running at a different speed from the first, vibration was set up which made it impossible for either to run without very grave risks.

After these girders were cut and separated by a space of only a few inches, all subsequent tests were satisfactory.

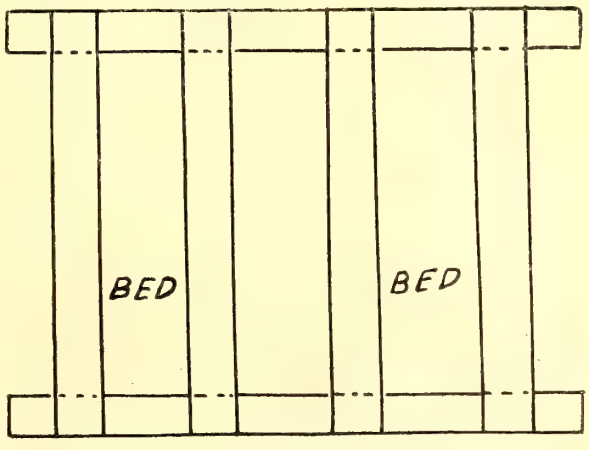


FIG. 34.

Test Brakes.

To test an engine it is essential that some means should be adopted to provide a constant, reliable, and easily calculated load. To be constant, it should be able to provide the load for the maximum period of the test without any fluctuation. As far as reliability is concerned, it is necessary that the indicated load should indicate the correct load—no more and no less.

That it is essential that the load should be easily calculated, is apparent from the fact that there is no time, on official tests, to waste upon intricate calculations.

The method adopted for testing engines of all sizes is by means of a brake. The design of brakes varies, some placing the load on the engine driving shaft by mechanical, others by electrical means

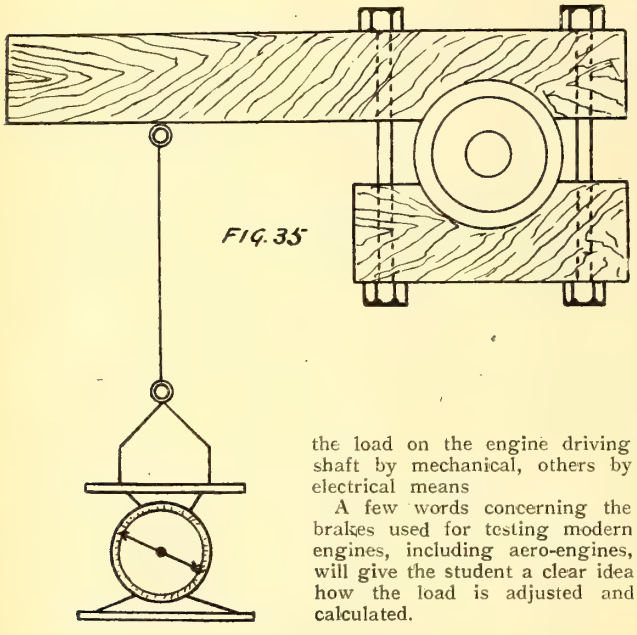


FIG. 35

A few words concerning the brakes used for testing modern engines, including aero-engines, will give the student a clear idea how the load is adjusted and calculated.

The Prony Brake.

This brake is probably the oldest type of brake in existence, and it is fairly satisfactory for testing small engines. The brake is illustrated in Fig. 35.

Here, it will be seen that in principle it consists of two wooden clamps held together round the outside of a special drum fitted on the engine shaft. The clamps are held in position by means of two long bolts and nuts. The latter are also used to place the required tension on the drum. Holes are bored in the upper piece of wood, through which soap and water are run to act as a lubricant.

The method of indicating the power developed by the engine is by means of a weight and spring balance. These are fitted as shown in the sketch.

The weight on the spring balance, after taking into consideration the distance it is from the centre of the pulley, is much more than the engine will lift under full load. It therefore follows that as there is a tendency of the beam to lift in the upward direction, and the weight is inclined to pull the beam down, the difference in these powers will be indicated on the scale.

For instance, we will presume that the weight is 100 lbs. Then, if the engine will lift, say, 20 lbs., the reading on the scale will be 60 lbs., thus indicating that the engine is exerting a power of 20 lbs.

This method of testing will give approximate readings for small power engines, but it is practically useless for the testing of large engines.

Eddy Current Brakes.

A few years ago it was thought that the electrical eddy current brake was to be the brake of the future. The results obtained by the first makes were certainly encouraging, but it was found that it was only with difficulty that brakes could be manufactured that would efficiently test engines up to 80 h.p.

Over and above this disadvantage, the intricate calculations that are necessary in order that the torque may be accurately determined is very much against its adoption. Windage, friction, and heat play an important part in this brake, and one is very apt to err when making these calculations, which are really out of the sphere of the mechanical engineer.

The Froude Water Dynamometer.

Here we have a brake that is extensively used for testing Diesel, gas, oil, and petrol engines. The writer has used it for testing Diesel engines up to 2,000 h.p.

Fig. 36 illustrates the end and side view of this brake. A brief description of the brake and its action is as follows:—

The main shaft supports a rotor revolving inside a casing through which water is circulated to provide the hydraulic resistance, and simultaneously to carry away the heat developed by the destruction of power.

In each face of the rotor, pockets are formed of semi-elliptical cross section divided from one another by means of oblique vanes. The internal faces of the casing are also pocketed in the same way.

When in action, the rotor discharges water at high speed from its periphery into the spaces formed in the casing, by which it is then returned at diminished speed into the rotor pocket at a point near the shaft. Thus, the pockets in the rotor and casing together form elliptical receptacles round which the water courses at high speed.

The resistance offered by the water to the motion of the rotor reacts on the casing, which tends to turn on its antifriction roller supports. This tendency is counteracted by means of a lever arm, at the end of which are suspended balance weights measuring the reaction.

From this it will be seen that the forces resisting the rotation may be divided into three classes:—

1. The hydraulic resistance created by the rotor.
2. The friction of the shaft bearings. This is almost negligible because they are of the roller type.
3. The friction of the glands.

It will be noticed that all these items react upon the casing, which being free to swivel on antifriction rollers, transmits the whole of the forces to the weighing apparatus.

Advantages of a Water Brake.

A great deal may be said in favour of the water brake in addition to its accuracy. The resistance, being hydraulic, is practically negligible at starting, but it increases rapidly with the speed. Moreover, it has a great range of output, the maximum power capacity being in some cases 100 times greater than the minimum at the same speed. Another considerable advantage is that the rotor inertia is very slight.

Calculation of Power.

As previously stated, one of the essential points of a good brake is that the power should be easily calculated. With the brake illustrated, the power may be calculated by the simple formula:—

$$\text{B.H.P.} = \frac{\text{W.} \times \text{N.}}{\text{K.}}$$

Where W is the load at the end of the dynamometer arm. N is the revolutions per minute, and K is the constant.

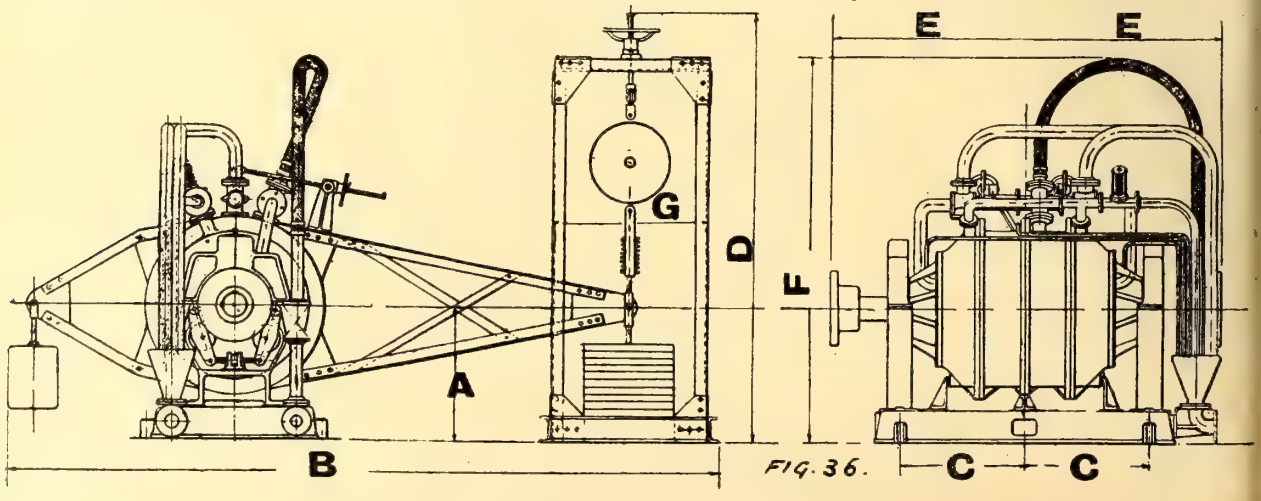
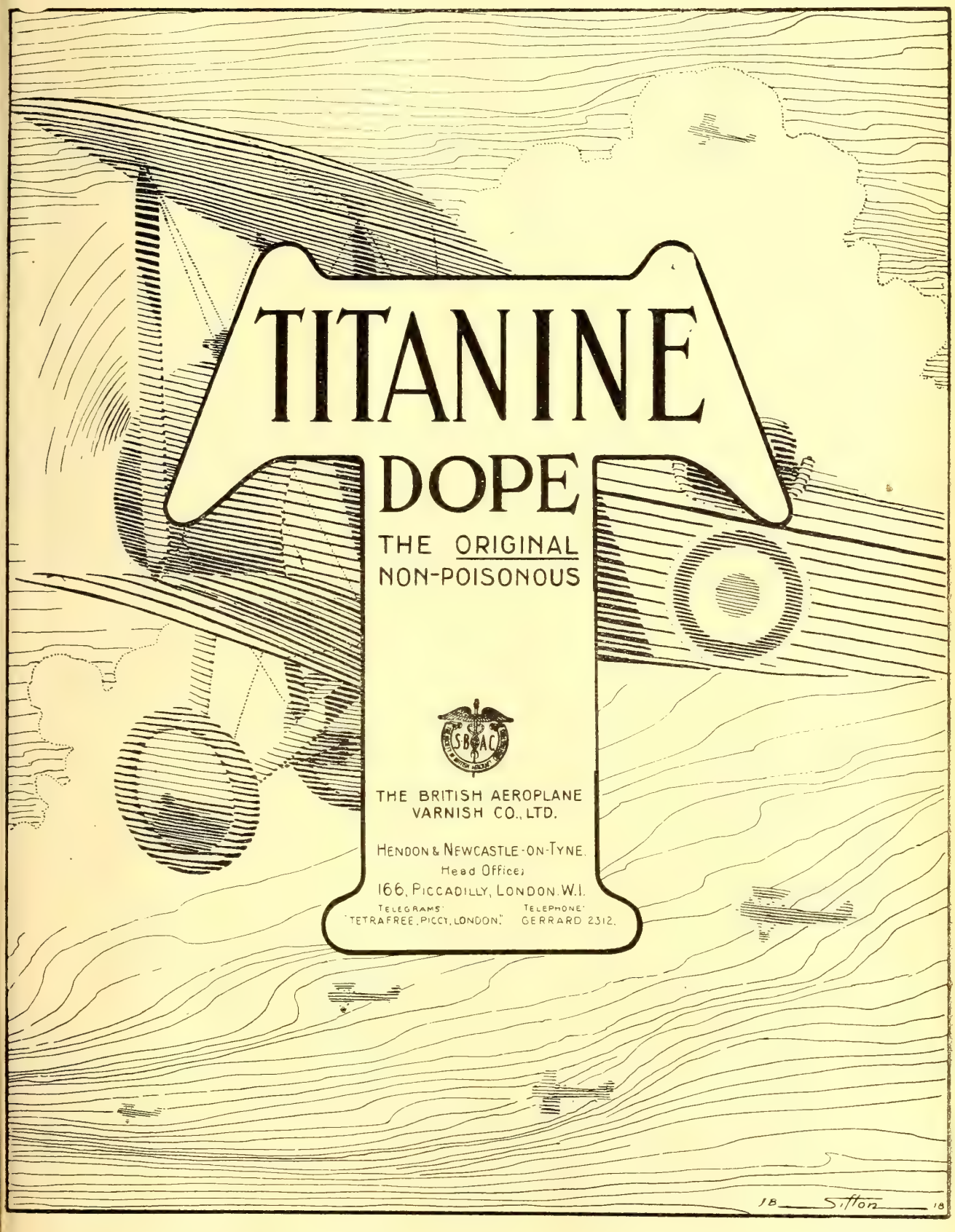


FIG. 36.


TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON, W.1.
TELEGRAMS:
"TETRAFREE, PICCY, LONDON."
TELEPHONE:
GERRARD 2312.

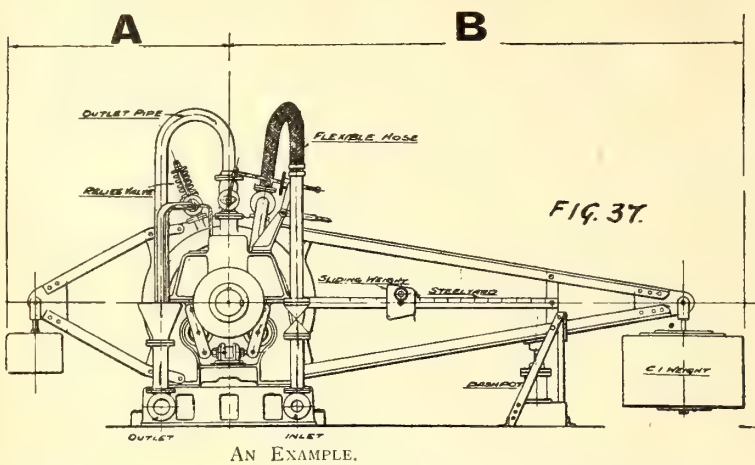


FIG. 37.

An Example.

We will presume that the speed of an engine is 1,500 r.p.m., and that the maximum weight it lifts is 200 lbs. Then, if the constant is 1200, the h.p. will be :—

$$\frac{200 \times 1500}{1200} = 250 \text{ H.P.}$$

In the sketch the letters merely refer to the dimensions of the dynamometer, which vary according to power. One example is, calculating the dimensions in inches :—

A	B	C	D	E
49	271	45	132	63 inches.

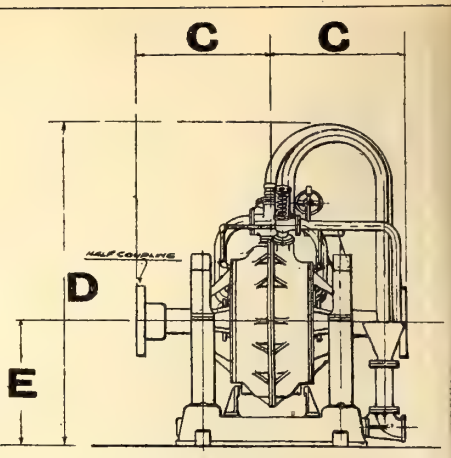
F and G are standard for several sizes.

Non-Reversible Dynamometers.

Fig. 37 illustrates this type of dynamometer. In this sketch it will be noticed that a very accurate adjustment may be obtained by means of a sliding weight fitted on a steel-yard. Here, the dimensions of one size are :—

A	B	C	D	E
90	180	54	126	49 inches.

From these figures it will be seen that the total overall length of the machine is more than 22 feet. This is not surprising since it is capable of testing an engine of 5,000 h.p.



The Generator Brake.

One of the most recent brakes used for the testing of engines is one designed and constructed by Electromotors, Ltd., Openshaw, Manchester.

This brake is similar in construction to a direct current generator, that is to say, it consists of an armature and pole pieces from which a certain voltage is generated.

The armature is wound with coils of sufficient cross sectional area to produce the maximum current without undue overheating. The load is placed on the engine by passing the desired amount of current through resistances.

Double pole switches, voltmeters, rheostats, ammeters, and wattmeters are arranged to allow for the easy regulation of the load and to enable it to be accurately determined.

There is one outstanding feature in favour of the adoption of this type of brake for engine testing. The generator, taking current from the supply mains for the shop, may be run as a motor for starting the engine. This does away with the installation of air-compressing plants for air starting. Again when the engine is running, the power generated will, at least, supply energy to the water circulating or air cooling motor for engine cooling.

These brakes are made to test engines up to 150 h.p. For testing engines of a larger power than this, two or more brakes may be connected together. The maximum speed of this type of brake is 1,600 r.p.m.

(To be continued.)



THE DRAUGHTSMAN

A PATHETIC SKETCH OF A MUCH DESPISED WORKER

Firth's
Best Cast Steel
Files.

Apply for Copy of the
New Official Price List.

Thos. Firth & Sons, L^d, Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

**Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.**

**Telephone No.—
KENSINGTON 6520 (4 lines).**

**Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.**

Co-operation in the Aircraft Industry.

BY DIOGENES.

I.—SOME GENERAL NOTIONS AND SUGGESTIONS.

When people talk of co-operation, they have in mind more often than not the idea that finds its concrete expression in the German syndicate or the American trust.

As a matter of fact, there are a thousand and one ways in which manufacturers in any industry can co-operate with one another. If we were to take only the common reading of the term, we should probably say off-hand that the Aircraft Industry is by no means ripe for co-operation; that co-operation involves a considerable degree of standardisation of product and that this is highly undesirable until the product has reached a stage at which changes in principle and in design are seldom necessary and seldom considerable.

Now if we choose to be broad-minded enough to realise that co-operation can conceivably exist without being complete, we shall, on examination, find not only that the Aircraft Industry is already ripe for quite a considerable measure of co-operation, but that it has in point of fact already achieved it in no inconsiderable degree.

In certain directions, of course, co-operation in an obvious form has been forced upon many of the firms that are temporarily, if not permanently, engaged in this industry. Those who have entered the Industry under stress of circumstances and not of their own free will are particularly likely to be now in the position of manufacturing on a co-operative basis, with the assistance of a number of other firms, an article which is identical with that similarly manufactured in a number of other works.

This is a form of co-operation which is likely only to be a temporary phase in the Aircraft Industry. It will die out when the necessity for its continuance ceases, but it will come again gradually at some later date, and then it will no longer be temporary, but will be a permanent part of the Industry's method.

The Growth of the S.B.A.C.

Meanwhile, aircraft manufacturers and particularly those who, either exclusively or as part of their production, do not regard their connection with the Industry as a transitory incident, are co-operating in ways that are perhaps less obvious, but that possess far more real significance. This co-operation began when the Society of British Aircraft Constructors was formed, and was brought about partly by an apparent desire in other quarters to do for the Aircraft Industry any co-operating that wanted doing.

As soon as the Industry began to find its feet, it began also to resent being treated as an infant in long clothes. It may be that in this respect it was precocious, but all things considered, its precocity cannot be regarded as surprising. Never has an industry grown so rapidly from a joke into a primary national necessity.

A Centre of Effort.

On questions of broad organisation and policy, co-operation between firms in an industry involves first the formation of some Association as a centre of co-operative effort. Next, it requires the machinery which will link up that Association or Society with the somewhat similar organisations already existing or being formed in other industries.

The Aircraft Industry has secured the machinery required for both of these purposes. In a very brief space it has created within itself a Society which is, undoubtedly, very efficient, and which has achieved more in its short life than almost any other organisation of the kind.

Its achievement has doubtless been assisted by extraneous circumstances, and by a strong and friendly public opinion. This latter is an immense asset of the Aircraft Industry, as a whole, and should be utilised to the full without being unfairly exploited.

Such exploitation is not in the least probable on the part of the industry, but is far more probable on the part of small groups of speculative capitalists. Very many industries pass through an uncomfortable period during which their reputations are besmirched, and their best interests damaged by the unscrupulous or wild behaviour of a few individuals.

The Evils of Booms.

A boom is brought about more or less artificially. The gullibility of the public is traded upon by company promoters, and, in a very short time, the inevitable trouble follows. The boom is then succeeded by a slump, and for the time being the industry is in a bad way.

If it has a sound foundation in the quality and the essential utility of its products, the swing of the pendulum does not absolutely ruin it, but, at the best, it only recovers gradually, and settles down at a point far less advanced than that which marked the heights of its early prosperity.

Now, I suggest that one of the ways in which a young industry can indulge in co-operation to its own best advantage is b using its influence to prevent itself being made the subject c wild financial flutters. As to how this might be done, it occur to me that an example might be taken from an effort made i the field of petroleum developments.

A Case in Point.

There was a time a few years ago when the public was almo always found ready to subscribe on the most flimsy evidence c the existence of oil. Some ignorant or unprincipled person woul discover that a particular piece of ground showed rather th same formation as that known to exist in a famous oilfield, an would immediately jump to the conclusion that immense deposi must lie below.

Somebody else would mistake a smell of paraffin, resultin from some local leakage from a pipe or barrel, for good evidenc of the existence of petroleum in the most accessible form imagin able. There was no recognised qualification by which the publi could judge whether a so-called expert was an expert in fact, c only in his own imagination.

This state of affairs brought about many disastrous incident and discredited not only those who deserved it, but those wh did not. The effort to check it took the form of the constitutio of a body of Petroleum Technologists. The qualifications fo membership of this body were regularised and one of its mai ideas, though hitherto limited in execution on account of th war, was that the Institution, as such, should definitely dis countenance all schemes which were not certified by responsibl men properly qualified to judge of them.

An Anti-Gambling Institution.

Now, is it altogether unreasonable to suggest that the Aircra Industry might work on rather similar lines and might creat a body which, in the interests of the Industry as a whole, woul examine into every project put before the public and becom so recognised that, if facilities for examination by that bod had not been granted, the project in question would autc matically come under suspicion?

This kind of thing, if it is to be done at all, ought to b organised before the trouble arises and not merely when th trouble has reached its height and the just have already bee blamed for the vagaries of the unjust.

Bogus Flotations.

One can imagine some very quaint propositions that might b put before the public in respect both of the manufacture an of the use of aeroplanes. Schemes for manufacture which hav really sound financial or engineering basis may be floated in th hope that the public, in its enthusiasm over the magnificen work of the Air Force, may be disposed to invest its mone without much inquiry. A few such flotations might discredi the whole Industry up to such a point that when really genuin firms and propositions required capital they would fail to get it.

Similarly, we shall, no doubt, meet with all kinds of projec for the running of aeroplane services. These will be based o more or less empirical figures as to the probable operating cos and the probable receipts from the carriage of passengers, mail or goods.

To Protect the Industry.

It will be a long time before the public will be qualified t analyse accounts of this kind and form any sound opinion as t whether they are honest. Consequently, my little suggestion fo co-operation in this sphere would amount to the constitution o some sort of Central Council or Committee which would b prepared to consider all schemes laid before it, and would eithe endorse such schemes as being in its opinion reasonable, or els would refuse to endorse them.

It could not be expected to report at length on every scheme but would merely refrain from endorsing any that were obvious or inherently unsound in the light of expert knowledge. Th investing public would then have something to go upon, and wild boom followed by a bad slump might be avoided.

Possibly there are legal reasons why any such scheme i altogether impossible. Perhaps the advisory body would ha itself open to all kinds of actions for libel or slander by thos to whom it would not give its name, but I think it would b worth while, at least, to take an opinion as to whether this woul be the case. If the thing could be done, then publicists an others anxious to help the Industry forward would be given a valuable lead which would assist them to separate the sheep from the goats with the greater certainty.

I have, however, rather digressed from the main issue into a mere side-line, and must return in my next article to more im portant business.

(To be continued.)



ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE

"CLERGET" PATENT AERO ENGINES.

ENGINEERS, LONDON.

"GWYNNE, LONDON."

ACCLES & POLLOCK, LIMITED.

MANUFACTURERS OF STEEL TUBING & PRESSWORK PARTS.

The Firm with the largest Aircraft experience in Tubular Components and Steel Presswork. Send us details of your requirements.

OLDBURY, BIRMINGHAM.

TELEGRAMS: "ACCLES, OLDBURY."
CODE: A.B.C., 5TH EDITION.
TELEPHONE: OLDBURY 111 (4 LINES).

Trade Mark. ANKH *Means Long Life.*

Allen's Steels

For Motor Cars
For Aeroplanes

All Standard Steels

to the Engineering Standards Committee, Air Board, and all other authoritative standards. Also special steels for every requirement of Aeroplane Manufacture.

WRITE FOR CATALOGUE D.

(Aeroplane and Motor Steels).

Post Free.

Edgar Allen & Co. Ltd.
Sheffield.

THE SELSDON
AERO AND ENGINEERING
CO., LTD.

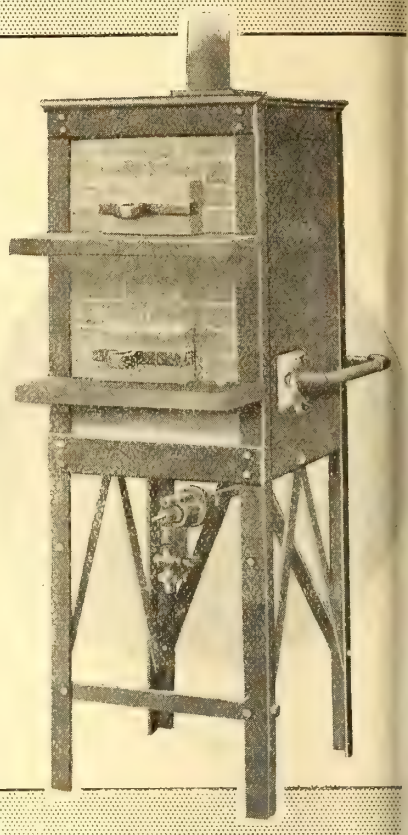
Engine
Components and Parts
GUN SYNCHRONIZING GEAR
Air, Oil, Water & Petrol Pumps

SELSDONAERO CROYDON

1, ALBEMARLE STREET, LONDON, W.1.

Telephones: REGENT 1181 and CROYDON 1761.
Telegrams: "SELAERO, PHONE, LONDON," & "SELAERO, CROYDON."

DAVIS
High-Speed Steel Furnaces



THE Davis "D.H.S.T." series of Gas-Fired Furnaces have been specially designed for the hardening of Modern High-Speed Steel Tools, and to provide the maximum of convenience and efficiency at the least practical fuel cost.

The firing element consists of Davis PATENT Air-Blast Burners, for Gas at ordinary main pressure and air at 2 lbs per square inch. Two chambers are provided, each fitted with stopper brick; a pre-heating temperature of 1,000° C being obtainable in the upper chamber and 1,350° C in the lower, whilst the flame does not impinge on the work.

Illustration shows the No. 100 size (each chamber $9\frac{3}{4}'' \times 5\frac{1}{2}'' \times 3\frac{3}{8}''$ inside). Price **£30** complete. Made in 4 other sizes—see Lists F18 A, B and C (gratis).

Also OVENS, MUFFLES, CRUCIBLES, LEAD-MELTERS, etc

THE DAVIS FURNACE CO
(Proprietors, THE DAVIS GAS STOVE CO., LTD.)
DEPT. Q, LUTON

WE CAN DELIVER—

A·G·S· Shackles

SIZES— (158) —A, B & C.

In any Quantities AT ONCE.

THE ACTUAL MANUFACTURERS

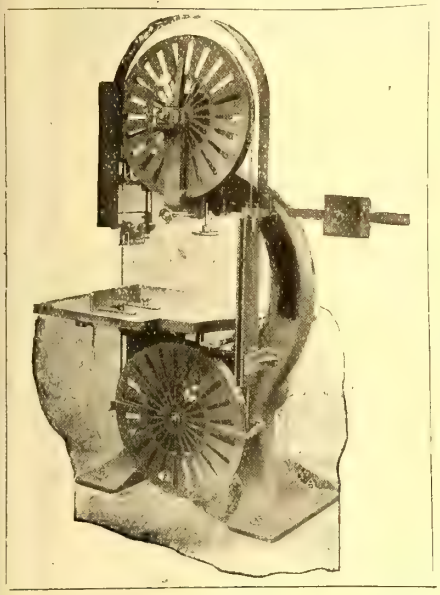
THE BRITISH GOLD SHELL RING CO., LTD., HOUNSLOW, MIDDLESEX.

Telephone; HOUNSLOW 254.

Telegrams, GOLSHEL - HOUNSLOW

HAIGHS
(OLDHAM) LIMITED

MANUFACTURERS OF ALL TYPES OF WOODWORKING MACHINERY.



C.K.S. Type High Speed

Band Sawing Machine

BUILT IN THREE SIZES
WITH SAW PULLEYS.

26 inches, 30 inches, and 36 inches diameter.

OLDHAM.

Telegrams: HAIGH, OLDHAM.
Telephone: 1273 Oldham.

Haighs (OLDHAM) LTD.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome
and
The GRAHAME-WHITE School of Flying.

Telegrams:
VOLPLANE, HYDE, LONDON.

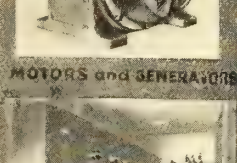
Telephone:
Kingsbury 120 (5 lines).



JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E.7.


CABLES.


OVERHEAD LINES.


MOTORS and GENERATORS.


SWITCHGEAR and TRANSFORMERS.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159W.George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

H. & O., Ltd.
Harris & Others, Limited,

AIRCRAFT CONSTRUCTORS,

Old Town, Clapham, S.W.4.

Phone: Battersea 1238 1047

WOODWORK, METALS, COVERING AND DOPING.

Sub-Contractors to leading Aeroplane Builders.
On Admiralty and War Office Lists.

HIGH-CLASS

Aluminium Castings

FOR ALL TRADES.

We specialise in Aluminium Cylinders and General Aero and Motor Engine Castings.

Cast Iron Cylinders

(ONLY)

Water and Air-Cooled for Aero and Motor Engines.

ALL THE ABOVE CASTINGS TO GOVERNMENT SPECIFICATION.

WILLIAM MILLS, LTD.,
ALUMINIUM AND IRON FOUNDERS

GROVE STREET,
BIRMINGHAM.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910. Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams
JONAS, SHEFFIELD.

REGISTERED I C N TRADE MARKS.

Telephone No. 4660.
Private Branch Exchange.

SIR JOSEPH JONAS, COLVER & Co., Ltd.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. **A SPECIAL NICKEL CHROME GEAR STEEL.**
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. **A NICKEL CHROME STEEL IN FOUR GRADES.**
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. **A HIGH GRADE ALLOY CASE HARDENING STEEL**
For severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

SHEFFIELD.



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeromnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3000.

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1092 (3 lines)

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2004 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London" Regent 612.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Martinsyde Ltd., Brooklands, Byfleet "Martinsyde, Weybridge." Woking 331 Byfleet 171

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London" Willesden 2455

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester

Saunders, S. E., Ltd., East Cowes, I.O.W "Consult, East Cowes" Cowes 195

Short Bros Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston" Kingston 1088 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

W. G. Tarrant, Byfleet, Surrey. Byfleet 1, 2 & 3. Tarrant, Byfleet.

Thames Aviation Works, 141, Curtain Rd., E.C.2

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London. Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London" Museum 5000

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1780-1

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships— Wimbledon 1314

Airships, Ltd., High Street, Merton.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent [illegible]8

Aluminium Castings (Sand and Die)

Coan, R. W., 210, Goswell Road, London, E.C.1. "Krankases, Isling, London." City 3816.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 396.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edibrac, 'Phone, London."

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London" [illegible]

Buildings— Avenue 995, 996, and 7[illegible]

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey Wimbledon 1[illegible]3

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone London." City 2681-2

Cable Coverings and Cable Controls—

The Bowden Brake Co., Ltd., Tyseley, Birmingham. Acock's Green 103 & 104 Bowden, Acock's Green.

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch." Redditch 61

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W.1 Victoria 4679

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico, London, Fen London." Avenue 34 and 35.

Celluloid (Non-Flammable)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1. Regent 2165

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (4 lines)

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Cellulate, London." Regent 4046

The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Ceilon, Ltd., 22, Cork Street London, W.1. "Ajawb, Reg, London." Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282

The Beauty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedes, Weybridge" Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8026.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolhead, London." Gerrard 1654 5-0

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 685.

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Ele[illegible] London" Walthamstow 408 [illegible]

Electrical Accessories—

Belling & Co., Montague Road, Upmonton, N.18. "Belling, Edm[illegible] Tottenha[illegible]

Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London." Central 2207, London W.

Mann, Egerton & Co., Ltd., 177, C[illegible] Street, London, W.1. "Installin[illegible] road, London." Mus[illegible]

Premier Electric Heaters, Ltd., 258, [illegible] 360, Bradford Street, Birmingham. [illegible] renheit, Birmingham." Midla[illegible]

The Rotax Motor Accessories Co., Ltd., [illegible]toria Road, Willesden Junction, "Rodynalite, Phone, London."

Electric Cables— Willesd[illegible]

E. Kalker & Co., Coventry. "Kalker, try." Covent[illegible]

Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London." Central 2207, London W.

Electric Lighting and Pow[illegible]

E. Stanley Fardon, A.M.I.E.E., 67, Street, Manchester

Johnson & Phillips, Ltd., Charlton, S.E.7. "Juno, London. Central 2207, London W.

Mann, Egerton & Co., Ltd., 177, Cl[illegible] Street, London, W. Museum 70[illegible] Installin[illegible] Fuse ad[illegible]

Electro Platers and [illegible] Polishers' Engineers—

W. Canning & Co., 133-137, Great [illegible] Street, Birmingham. "Materia[illegible] mingham. Birmingham 3622 Central [illegible]

Enamel—

Silico Enamel Co., New Cross, Londo[illegible]

Flare Lights—

Imperial Light, Ltd., 123, Victoria Stre[illegible] don, S.W.1. "Edibrac, 'Phone, L[illegible]

Flexible Shafts—3540 Victoria [illegible]

Herbert Terry & Sons, Ltd., [illegible] "Springs, Redditch." Redd[illegible]

Fluxes—

Imperial Light, Ltd., 123, Victoria St[illegible] minster, London, S.W.1. Victo[illegible] (3 lines). "Edibrac, 'Phone, Lond[illegible]

Flying Schools—

Bournemouth Aviation Co., Ltd., Tal[illegible] lage, Bournemouth. "Eiches, Win[illegible] Bournemou[illegible]

Cambridge School of Flying and Aerodr[illegible] 308, St. Andrews St., Cambridge. [illegible] bon, Cambridge." Cambridge 5[illegible]

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury [illegible] House, London, E.C.2.

Galvanising— London Wall 573 a[illegible]

Boulton & Paul, Ltd., Rose Lane, [illegible] "Aviation, Norwich." Norw[illegible]

Gauges—

J. A. Prestwich & Co., Northumberlar[illegible]

Gears— Tottenham, N.17.

Moss Gear Co., Ltd., Thomas Street Birmingham "Mosgear, Birming[illegible]

Glue—

Cannon, B., & Co., Ltd., Lincoln. Office, 110, Cannon Street, "Bececolin, Cannon, London." [illegible]

Improved Liquid Glues Co., Ltd., Gt. [illegible] tage Street, E. (Croid.). "E[illegible] Wapp, London." Aven[illegible]

Mendine Co., 8, Arthur Street, E.C. Ba[illegible]

Oldroyd, Wm., & Sons, Ltd., 9, Mincin[illegible]

Goggles—

Triplex Safety Glass Co., Ltd., 1, A[illegible] Street, Piccadilly, W.1 "Shatterly London" Reg[illegible]

Hack Saw Blades & Machin[illegible]

Victor Saw Works, Ltd., 2 and [illegible] Street, Finsbury Circus, Londo[illegible] Vicsaw, Phone, London." London W[illegible]

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 Southwark Street, London, S.E.1. [illegible] London" Hop 372 [illegible]

Sturtevant Engineering Co., Ltd., 147 Victoria Street, London, E.C.4. [illegible] tevant, London." Central 7121

Hollow Spars—

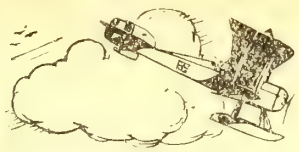
McGruer Bentwood Hollow Spar Co[illegible] mercial Wharf, Lambeth, S.E. [illegible] son, Watloo, London."

Robert Young's Construction Co., Ltd. [illegible] bury Street, Essex Road, London.

Instruments—

British Wright Co., Ltd., 33, Chancer[illegible] W.C.2. Holbo[illegible]

Buyers' · Guide.



rments (Scientific, Alti-ters, etc.)—

umbridge Scientific Instrument Co., Ltd., mbridge. "Instrument, Cambridge" Cambridge 642.

& Mason, Ltd., Macdonald Road, lthamstow, E.17. "Aneroid, Phone, ndon" Walthamstow 180.

er Cloth—

'egamoid Ltd., 134, Queen Victoria St., ndon, City 9704 (2 lines). Pegamoid, nt, London

eto Driving Pieces—

t Terry & Sons, Ltd., Redditch. prings, Redditch." Redditch 61

ctos—

-L Magneto Syndicate, Ltd., Coventry. Corlton, Coventry." Coventry 1008-1009.

ritish Lighting & Ignition Co., Ltd., Tottenham Court Road, W.1. "Vicks g, Phone, London" Museum 43

ritish Thomson-Houston Co., Ltd., Lower rd Street, Coventry. "Asteroidal, Coven- ." Coventry 278.

Manufacturers—

. Chas., & Sons, Ltd., Birmingham ifford, Birmingham." Central 42-43

in General— Avenue 1432

, J. B., & Son, 30, St. Mary Axe, E.C.3

& Co., 46, Fenchurch Street, London, .3. "Poetry, Fen, London." Avenue 665, 666, and 7006

Mercer & Co., 198, Upper Thames eet, E.C.4. "Reconciled, Cannon, ndon." City 6342.

Parts and Fittings—

& Pollock, Ltd., Oldbury, Birmingham. cles, Oldbury" Oldbury 111 (3 lines)

ine General Sundries, Ltd., Fulwood use, Fulwood Place, High Holborn, .C. "Zeppiskout, Holborn, London." Holborn 4959.

t Supplies Co., Ltd., Ascot House, 25, g Acre, W.C.2 Upcast, Rand, ndon" Gerrard 276 (2 lines)

& Harrison, Ltd., Hythe Road, Willes- Junction. Willesden 2207.

. Jones & Bayliss, Ltd., Wolverhampton. lts and Nuts.) "Bayliss, Wolverhamp- ." Wolverhampton 1041.

rn Aeroplane & Motor Co., Ltd., mpia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines)

Metal (Kingston), Ltd., Kingston-on- ames

. J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432

rd Rim and Tube Co., Lombard Street, rmingham. Lombardic, Birmingham." Midland 211 (2 lines).

Egerton & Co., Ltd., 177, Cleveland eet, London, W.1. "Installing, Eus- d, London" Museum 70.

ord, Fredk., Lt., Lifford, Birmingham. Fremo, Birmingham." King's Norton 261.

son, J. H., & Co., 1, Albemarle Street, ndon, W.1 Regent 3006.

, Owen, & Co., Darlaston South Staffs.

. Joseph & Sons, Ltd., Wellington ropshire. "Sankey, Wellington, Salop." Wellington 67

ulvo Engineering Co., Ltd., 10 to 16, ne Street, High Holborn, London, W.C.1. ulvipult, Phone, London." Holborn 410.

elsdon Aero & Engineering Co., Ltd., Albemarle Street, Piccadilly, W.1. Selaero, Phone, London." Regent 1181.

Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. Rodynalite, Phone, London." Willesden 2480.

pson Bros., Ltd., Bradley, Bilston. Thompson Bros., Bilston." Bilston 10.

e Engineering Co., Ltd., Old Oak Com- on Lane, Willesden Junction, N.W.10.

Shearing Tools—

omery, Smith & Co., Ltd., Keynsham, ar Bristol. "Ingenuity, Saltford." Keynsham 21.

Spinnings—

l & Sons, Lawrence Road, Tottenham, .15.

Bolts—

nore Bros., Hildreth Street, Balham, W. Battersea 415.

y Owen & Co., Darlaston, South Staffs.

llaneous—

son, D., & Son, Ltd. (Roofs), Belfast. Anderson, Belfast." Belfast 4033-4034-4035.

en Wire, Ltd., Willesden Junction, Bowirelim, Harles, London." Willesden 2400 (3 lines

n Metal (Kingston), Ltd., Kingston-on- hames.

n Bros., Ltd., Great Eastern Street, .C.2. "Imbrowned, Bethroad, London" London Wall 6300

Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

MacLennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Threads City 3115

Motor Cars—

Arrol Johnston, Ltd., Dumfries "Motar, Dumfries" Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegeran, Euston road, London" Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry" Coventry 530 (4 lines).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing"

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterless, Piccy, London" Regent 1340

Parachutes— London." Regent 1340

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London" London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry 7.

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 22a, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon.

Presswork— London. Hop 4340.

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Ebora, Kingston" Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon & Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks, Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich" Norwich 482 (4 lines)

Odds, W. D., & Co., Leeds. "Airscrews, Leeds." 24214 Leeds

Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120

Pyrometers— Yeovil" Yeovil 120

The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth, Letchworth 26

Radiators—

Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Gallyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor" Bognor 48

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1537.

Seats for Aeroplanes—

Bowser, E., 50, Park Lane, Leeds. Leeds 21953.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2480.

Shackles—

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London" Willesden 2840

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham "Brisk, Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 407 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs S.W.1. "Flamma, Vic, London." Vic 4820.

Sheet Metal Work—

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames

Rubery Owen & Co., Darlaston, South Staffs.

The Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Imperial Light, Ltd., 123 Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines) "Ediorac, 'Phone, London."

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 255.

Ripault, Leo, & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs— don." Gerrard 7758.

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings— Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines).

Tanks & Cowls for Aeroplanes

Zephyr Ventilating Co., Ltd., Tyrpiatt Road, Bristol. Telegrams—Zephyr, Bristol.

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 1526.

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 406.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 100a, Borough High Street, S.E.1. "Bucheron, London" [illegible] (3 lines)

BUYERS' GUIDE cont. on next page



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Aviation Co "Aeronaut, Pacy, London Gerrard 258 (6 lines)

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd. The 49 Victoria Street, Westminster, S.W. "Fluminis, Vic, London" Vic 4832
Imperial Light, Ltd. 123, Victoria St., Westminster, London, S.W. "Edibrac, Phone, London" Victoria 3540 (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd. Hendon "Airmanship, Hyde, London" Kingsbury 181
Armstrong, Sir W., Whitworth & Co., Ltd. Newcastle-on-Tyne "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 586
Blackburn Aeroplane & Motor Co., Ltd. Olympia, Leeds "Pectoris, Leeds" Roundhay 345 (5 lines)
Boulton & Paul, Ltd. Rose Lane, Norwich. "Aviation, Norwich" Norwich 851
British & Colonial Aeroplane Co., Ltd. The Bristol Coy., Filton, Bristol "Aviatrix, Bristol" Bristol 2179
British Caudron Co., Ltd. Broadway, Cricklewood, N.W. 2 "Caudronph, Cricle, London" Hampstead 1640
Central Aircraft Co. Ltd. Park Road, Kilburn, N.W. 6 "Avitruvian, Phone, London" Hampstead 4263 and 4264
Dawson Aviation Co., Ltd. Hammersmith, W.6. Hammersmith 2022 (2 lines)
Dawson, John & Co., Ltd. Newcastle-on-Tyne "Dependable, Newcastle-on-Tyne" Central 2604 (2 lines)
Eastbourne Aviation Co., Ltd. Eastbourne "Aircraft, Eastbourne" Eastbourne 441
Grahame-White Aviation Co., Ltd. Lane's Aerodrome, Hendon. "Volplane, Hyde, London" King Dick 1
Handley Page, Ltd., 110 Cricklewood Lane, N.W. 2 "Hydroplid, Cricle, London" Hampstead 1744
Hooper & Co., Ltd. 54, St. James St., Piccadilly, London, S.W. "Sons Of St. James, London" Regent 1424
Mann, Egerton & Co., Ltd. Norwich "Motor, Norwich" Norwich 482 (4 lines)
Thompson & Brooklands, Bristol "Monoplane, Weybridge" Weybridge 348
National Aircraft Manufacturing Co., Ltd. 12 Dicconson Street, Wigan, and 3, Norfolk Street, Manchester Manchester 3373
"Newport" Aircraft Accessories Co., Ltd. Elmwood Factory, Chiswick, W.4. "Newcastle, Chiswick, London" Wireless 2455
Norman Hamilton Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 38
The Regent Carriage Co., Ltd. 126-34, St. King's Road, Fulham, S.W. "Caboodle, London" Putney 2240-2241
Roe, A. V. & Co., Ltd. Manchester "Avimo, Manchester" City 8430-8431, Manchester
Saunders, S. E., Ltd. The Cowes, I.O.W. "Coastal, East Cowes" Cowes 4
Short Bros. Rochester & Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 488
Sopwith Aviation Co., Ltd. Kingstonian Thames. "Sopwith, Kingston" Kingston 1088 (8 lines)
Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. "Standair, Phone" East 2823
W. G. Tarrant, Byfleet, Surrey Byfleet 1, 2 & 3 Tarrant, Byfleet
Thames Aviation Works, 141, Curtain Rd., E.C.2 Curtain Rd. Depot, Curtain Court, Kingsbridge, S.W.1 "Vivacities, Knights, London" Kensington 681
Waring & Gillow, Ltd. Hammersmith "Warisen Ox, London" Museum 5900
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 126
White, J. Samuel & Co., Ltd., East Cowes "White, East Cowes" Cowes 4
Whitehead Aircraft (1917), Ltd., Richmond, Surrey "Whitcraft, Richmond, Surrey" Richmond 1780-1

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe" High Wycombe 84

Airships—

Airships, Ltd., High Street, Merton
Short Bros., Rochester, Eastchurch and White Hall Hse., S.W. "Tested, Phone, London" Victoria 3540 & Victoria 4

Aluminium Castings (Sand and Die)

Coan, R. W. 280, Goswell Road, London, E.C. "Krinkas, Isling, London" City 5846

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1 "Hoptons, Euston, London" Museum 496
Also at Market Harborough, Leicestershire "Hoptons, Market, Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd. Wortley, Leeds "Yes, Leeds" Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd. The 49, Victoria Street, Westminster, S.W.1 "Fluminis, Vic, London" Vic 4832
Imperial Light, Ltd. 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edibrac, Phone, London"

Brass Sheets for Tipping Propellers—

Pratt & Co., 42, Fenchurch Street, London, E.C. "Poetrs, Fen, London" Gerrard 6005 and

Buildings—

Boulton & Paul, Ltd. Rose Lane, Norwich. "Aviation, Norwich" Norwich 851
Parnall, W. & Co. Church Road, Mangotsfield, Bristol "Parnall, Aviate, Bristol" Bristol 2179
Rubery, Owen & Co., Darlaston, South Staffs. The Willfey Co., Ltd., Salisbury House, London Wall, E.C. "Wealthies, Phone, London" City 2852
Cable Coverings and Cable Controls—
The Bowden Brake Co., Ltd., Tyseley, Birmingham. Alcock's Green 103 & 104 Bowden, Alcock's Green
Herbert Terry & Sons, Ltd. Redditch "Springs, Redditch" Redditch 18

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Rd., S.W. Victoria 4070

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C. 3 "Surnico, London" Avenue 34 and 35

Celluloid (Non-Flam.)—

Greenland & Sons, 8, Water Lane, E.C. "Greenland, London" Central 1306-7

Clothing—

Burberrys, Ltd., Haymarket, S.W.1. Regent 2165
Dunaday, Ltd. Euston Road, N.W.1 "Dun, Euston" North 3405 6

Coloured Rags

Joseph, W. & Son, 52, London Road, Southwark, S.E.1 "New Mungo, Sedist, London" Hop 83, 963, 427.

Component Parts—

Accles & Pollock, Ltd. Oldbury, Birmingham "Accles, Oldbury"
Central Aircraft Co. High Road, Kilburn, N.W.6 "Aviation, Phone, London" Hampstead 4263 and 4434
PDV Aircraft Co., Ltd., Princes Street, Richmond "Veros, Richmond" Richmond 1681
Thompson Bros. Coaches, Ltd. Bredon, Bognor, Sussex "Thompson Bros, Bildon"

Cords, Tapes, and Threads—

Mossman, J. & Co., 30, Newgate Street, E.C.1 And at Glasgow City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1 "Tetrafree, Piccy, London" Gerrard 2312
British Cellulose Co., 8, Waterloo Place, S.W.1 "Cellulose, London"
The British Emaustic Co., Ltd., 30, Regent Street, S.W.1 "Rubbygreen, Piccy, London" Gerrard 280
Ceilon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg, London" Gerrard 440
Clark, Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2 "Pearlin, Westrand, London" Regent 3913

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford "Pump, Bedford" Bedford No. 1
Arnal Johnson Ltd. Dumfries "Motor, Dumfries" Dumfries 284-285.
The Bristol Aeroplane Co., Ltd. The Brooklands Aero Engine Co., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1 "Aerofight, Vic, London" Vic 7020
Gordon Watson & Co., Ltd., Westbridge "Merced, Westbridge" Weybridge 550 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1705
Gwynne, C. A., Ltd., Hammersmith, W. "Gwynne, Hammersmith, London"
Napier & Son, Ltd., 14, New Bridge Street, London, W. and "Napier, London" Gerrard 8020
Nitrifier, London "Nitrifier, London"
Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolls, London" Gerrard 1634
Sunbeam Motor Car Co., Ltd. Wolverhampton "Mascha, Wolverhampton" Wolverhampton 685
The Gnôme & Le Rhône Engine Co., Ltd., 47, 48, 49, 50, 51, Conduit St., W. "Gnôme, London" Mayfair 4477
Wolseley Motors, Ltd. Adderley Park, Birmingham "Wolseley, Birmingham" Nechells 49

Electrical Accessories—

Belling & Co. "Belling, Enfield" Enfield 1
Johnson & Phillips, Ltd. Charlton, London, S.E.7 "Johnex, London" Greenwich 1020
Mann, Egerton & Co., Ltd. Norwich "Motor, Norwich" Norwich 482 (4 lines)
Premier Electric Heaters, Ltd. 358, Bath Street, Birmingham "Premier, Birmingham"
The Rotax Motor and Accessory Co., Ltd. Rotax Works, Willesden Junction, London, N.W.10 "Rotax, Phone, London" Willesden 2480

Electric Cables—

E. Kalker & Co., Coventry "Kalker, Coventry"
Rubery, Owen & Co., Darlaston, South Staffs.
The Willfey Co., Ltd., Salisbury House, London Wall, E.C. 2 "Wealthies, Phone, London" City 2852

Electric Lighting and Power Plants—

E. Stanley Wade, Ltd., Wade's Mill, Sheffield "Wade, Sheffield" Sheffield 4
Johnson & Phillips, Ltd. Charlton, London, S.E.7 "Junic, London" Greenwich 1020
Mann, Egerton & Co., Ltd., 317, Cornwall Street, London W. "Museum, London" Museum 2
Electro Platers and Metal Polishers' Engineers—
W. Canning & Co., 133, 135, Great Hampton Street, Birmingham "Masters, Birmingham" Birmingham 3622 Central

Enamel

Silico Enamel Co., New Cross, London

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, Westminster, London, S.W.1 Victoria 3540 (3 lines) "Edibrac, Phone, London"

Flying Schools—

Bournemouth Aviation Co., Ltd. Hamble, Southampton "Hades, Hamble"
Cambridge School of Flying and Aeroplane Construction, 308, St. Andrews St., Cambridge "Caudron, Cambridge" Cambridge 97
Furniture (Office)—
Cooke's (Finsbury), Ltd. Finsbury Pavement House, London E.C.

Galvanising—

Boulton & Paul, Ltd., Rose Lane, Norwich "Galvanic, Norwich"

Gauges—

J. & J. Prestwich & Co., Northumberland Street, Tottenham, N.17.

Gears—

Moss Gear Co., Ltd. Hall Street, Birmingham "Mossgear, Birmingham"

Glue—

Cannon, B., & Co., Ltd. Lincoln "Cannon, Office, Lincoln" Lincoln 1
"Breccolin, Cannon, London"
Improved Liquid Glues Co., Ltd. (Croid), Stage Street, Battersea, S.W. "Croid, Wapp, London"
Mendine Co. Arthur Street, E.C. "Mendine, Oldfield Wm., & Sons, Ltd., 9, Maiden Lane, Strand, W.C.2 "Oldfield, London"

Goggles—

Triplex Safety Glass Co., Ltd., 1, Ashley Street, Piccadilly, W.1 "Shrieve, London"

Hack Saw Blades & Machines—

Victor Saw Works, Ltd., Sheffield "Victor, Sheffield" Sheffield 3
Vivian, Sons & Nicholson, Ltd., Great Eastern Street, Finsbury Circus, London, E.C. "Vivsaw, Phone, London" London Wall 6300

Heating and Ventilating—

Chas. P. Kennell & Co., Ltd., 6, Southwark Street, London, S.E.1 "Kennell, London"
Sturtevant Engineering Co., Ltd., 72, Victoria Street, London, E.C. "Sturtevant, London" Central 7720

Hollow Spars—

McGruer Brinwood Hollow Spar Co., Ltd., Emerald Wharf, Tunnel, S.E. "Emerald, London"
Sun Wilson & Co., Ltd., Hollow Spar Works, Kingston, Surrey "Sunwilson, Kingston" Kingston 220 (3 lines)
Robert Young & Construction Co., Ltd., Canal Bridge, Hythe Road, Willesden Junction, N.W.10 "Youngbuild, Willesden" Willesden 2480.

Instruments—

British Wright Co., Ltd., 45, Charing Cross, W.C.2

Buyers' Guide.



Instruments (Scientific, Altimeters, etc.)—

[illegible] Instrument Co., Ltd., 45, Charing Cross, W.C.2 "Instrument, Cinema, London" Gerrard 2414
Cambridge Instrument Co., Ltd. Cambridge 842
Muirhead & Co. Muirhead Works, Elmer's End, Beckenham "Muirhead, Beckenham" Beckenham 430
Negretti & Zambra, 38, Holborn Viaduct, London, E.C. "Negretti, London" Phone, Holborn 1305
Watkins & Hill, Ltd. Buckhurst Hill, Essex "Watkins, Buckhurst Hill" Walthamstow 180

Linen or Cloth—

Barbour, J. & Sons, Ltd., 134, 135, 136, Queen Victoria St., E.C. 4 "Barbour, London" 10368 (3 lines) Pegamoid, Phone, London

Motor Driving Pieces—

Herbert Terry & Sons, Ltd. Redditch "Springs, Redditch" Redditch 18

Motors—

Aster, Ltd., Coventry "Aster, Coventry" Coventry 1068-1069
Bayliss, Jones & Bayliss, Ltd. Wednesfield, Staffs. "Bayliss, Wednesfield" Wednesfield 40
Daimler Co., Ltd. Coventry "Daimler, Coventry" Coventry 2
Hobson, H. M., Ltd., Lower Richmond Road, Putney, London, S.W. "Carburetter, Fulham" Putney 1297
Rotherham & Sons, Ltd., Coventry "Rotherham, Coventry" Coventry 2, 3, 4

Nuts, Bolts and Screws—Manufacturers—

Aston, Chester & Son, Ltd., Birmingham "Aston, Birmingham" Central 2243

Oil—Motor and Lubricating—

Anglo-American Oil Co., Ltd. 36, St. Mary Axe, E.C. 3 "Anglamo, London" Avenue 1430
Carless, Capel & Leonard, Ltd. Hatton Garden, London, E.C. "Carless, London" Holborn 1000
Price's Patent Candle Co., Ltd. 110, Upper Thames Street, E.C. "Candles, Cannon, London" Central 9342

Parts and Fittings—

Accles & Pollock, Ltd. Oldbury, Birmingham "Accles, Oldbury"
Bayliss, Jones & Bayliss, Ltd. Fulwood Works, High Holborn, London "Fulwood, London" Holborn 4 50
Bowden Wire, Ltd. Bowden House, Great Portland Street, London, W. "Bowden, Wesdo, London" Museum 1474
Brampton Brothers, Ltd. Victoria Street, Wolverhampton "Brampton, Wolverhampton" Wolverhampton 1481
Dunlop Rubber Co., Ltd., Aviation Dept., Fort Dunlop, Birmingham "Dunlop, Birmingham" Birmingham 4000
Hobson, H. M., Ltd., 29, Vauxhall Bridge Rd., S.W. "Carburetter, Fulham" Victoria 4070
Lucas, J., Ltd. Great Hampton Row, Birmingham "Lucas, Birmingham" Central 2244
Mann, Egerton & Co., Ltd. Norwich "Motor, Norwich" Norwich 482 (4 lines)
Rotherham & Sons, Ltd., Coventry "Rotherham, Coventry" Coventry 2, 3, 4
Stanley Aviation Co., 67, Kingsford Road, Leeds "Stanley, Leeds" Leeds 844
Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 126

Pyrometers—

The Foster Instrument Co. Letchworth, Herts "Foster, Letchworth" Letchworth 27
Foster Instruments, Letchworth, Letchworth 27

Radiators—

Gillan & Bristor Co., Ltd., 108, Great Portland Street, W.1. "Gillanbro, Wesdo, London" Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo. & Co., Ltd. Wakefield, England "Cradock, Wakefield" Wakefield 486

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C. 1 "Masticator, Isling, London" City 5814 and 3812

Safety Belts—

Holmes, C. H. & Son, 38, Albert Street, Manchester "Semilob, Manchester" City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd. Littleworth, Redditch "Inventors, Redditch" Redditch 74

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd. Olympia, Leeds "Pectoris, Leeds" Roundhay 345 (5 lines)
Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217
Mann, Egerton & Co., Ltd. Norwich "Motors, Norwich" Norwich 482 (4 lines)
The Norman Thompson Flight Co., Ltd. Middleton, Bognor "Soaring, Bognor" Bognor 38
Short Bros., Rochester. "Seaplane, Rochester" Chatham 627
Supermarine Aviation Co., Ltd. Southampton "Supermarine, Southampton" Southampton 1537

Seats for Aeroplanes—

Bowser, E., 150 Park Lane, Leeds. Leeds 21953.

Searchlights and Landing Lights—

[illegible] Ltd., [illegible] Aviation Service, London [illegible] Gerrard 1
[illegible] Marconi's Wireless Telegraph Co., Ltd. Chelmsford "Marconi, Chelmsford" Chelmsford 77
[illegible] Aeronautical and Motor Co., Ltd. [illegible] Park, Bradford "Propellor, Bradford" Bradford 1
Blackburn Aeroplane & Motor Co., Ltd. Olympia, Leeds "Pectoris, Leeds" Roundhay 345
W. H. Bristow & Co., Ltd. Hall Lane Works, Willesden, London, N.W. "Bristow, Kilburn" Willesden 2840

Shackles—

Britic Chain & Steel Ring Co., Ltd., Hounslow, Middlesex "Gadsil, Hounslow" Hounslow 254
Accles & Pollock, Ltd. Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Bristol Aeroplane Co., Ltd. The Brooklands Aero Engine Co., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1 "Aerofight, Vic, London" Vic 7020
Gordon Watson & Co., Ltd., Westbridge "Merced, Westbridge" Weybridge 550 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1705
Gwynne, C. A., Ltd., Hammersmith, W. "Gwynne, Hammersmith, London"
Napier & Son, Ltd., 14, New Bridge Street, London, W. and "Napier, London" Gerrard 8020
Nitrifier, London "Nitrifier, London"
Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolls, London" Gerrard 1634
Sunbeam Motor Car Co., Ltd. Wolverhampton "Mascha, Wolverhampton" Wolverhampton 685
The Gnôme & Le Rhône Engine Co., Ltd., 47, 48, 49, 50, 51, Conduit St., W. "Gnôme, London" Mayfair 4477
Wolseley Motors, Ltd. Adderley Park, Birmingham "Wolseley, Birmingham" Nechells 49

Electrical Accessories—

Belling & Co. "Belling, Enfield" Enfield 1
Johnson & Phillips, Ltd. Charlton, London, S.E.7 "Junic, London" Greenwich 1020
Mann, Egerton & Co., Ltd. Norwich "Motor, Norwich" Norwich 482 (4 lines)
Premier Electric Heaters, Ltd. 358, Bath Street, Birmingham "Premier, Birmingham"
The Rotax Motor and Accessory Co., Ltd. Rotax Works, Willesden Junction, London, N.W.10 "Rotax, Phone, London" Willesden 2480.

Electric Cables—

E. Kalker & Co., Coventry "Kalker, Coventry"
Rubery, Owen & Co., Darlaston, South Staffs.
The Willfey Co., Ltd., Salisbury House, London Wall, E.C. 2 "Wealthies, Phone, London" City 2852

Electric Lighting and Power Plants—

E. Stanley Wade, Ltd., Wade's Mill, Sheffield "Wade, Sheffield" Sheffield 4
Johnson & Phillips, Ltd. Charlton, London, S.E.7 "Junic, London" Greenwich 1020
Mann, Egerton & Co., Ltd., 317, Cornwall Street, London W. "Museum, London" Museum 2
Electro Platers and Metal Polishers' Engineers—
W. Canning & Co., 133, 135, Great Hampton Street, Birmingham "Masters, Birmingham" Birmingham 3622 Central

Enamel

Silico Enamel Co., New Cross, London

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, Westminster, London, S.W.1 Victoria 3540 (3 lines) "Edibrac, Phone, London"

Flying Schools—

Bournemouth Aviation Co., Ltd. Hamble, Southampton "Hades, Hamble"
Cambridge School of Flying and Aeroplane Construction, 308, St. Andrews St., Cambridge "Caudron, Cambridge" Cambridge 97

Furniture (Office)—

Cooke's (Finsbury), Ltd. Finsbury Pavement House, London E.C.

Galvanising—

Boulton & Paul, Ltd., Rose Lane, Norwich "Galvanic, Norwich"

Gauges—

J. & J. Prestwich & Co., Northumberland Street, Tottenham, N.17.

Gears—

Moss Gear Co., Ltd. Hall Street, Birmingham "Mossgear, Birmingham"

Glue—

Cannon, B., & Co., Ltd. Lincoln "Cannon, Office, Lincoln" Lincoln 1
"Breccolin, Cannon, London"
Improved Liquid Glues Co., Ltd. (Croid), Stage Street, Battersea, S.W. "Croid, Wapp, London"
Mendine Co., Arthur Street, E.C. "Mendine, Oldfield Wm., & Sons, Ltd., 9, Maiden Lane, Strand, W.C.2 "Oldfield, London"

Goggles—

Triplex Safety Glass Co., Ltd., 1, Ashley Street, Piccadilly, W.1 "Shrieve, London"

Hack Saw Blades & Machines—

Victor Saw Works, Ltd., Sheffield "Victor, Sheffield" Sheffield 3
Vivian, Sons & Nicholson, Ltd., Great Eastern Street, Finsbury Circus, London, E.C. "Vivsaw, Phone, London" London Wall 6300

Heating and Ventilating—

Chas. P. Kennell & Co., Ltd., 6, Southwark Street, London, S.E.1 "Kennell, London"
Sturtevant Engineering Co., Ltd., 72, Victoria Street, London, E.C. "Sturtevant, London" Central 7720

Hollow Spars—

McGruer Brinwood Hollow Spar Co., Ltd., Emerald Wharf, Tunnel, S.E. "Emerald, London"
Sun Wilson & Co., Ltd., Hollow Spar Works, Kingston, Surrey "Sunwilson, Kingston" Kingston 220 (3 lines)
Robert Young & Construction Co., Ltd., Canal Bridge, Hythe Road, Willesden Junction, N.W.10 "Youngbuild, Willesden" Willesden 2480.

Instruments—

British Wright Co., Ltd., 45, Charing Cross, W.C.2

Shackles—

Britic Chain & Steel Ring Co., Ltd., Hounslow, Middlesex "Gadsil, Hounslow" Hounslow 254
Accles & Pollock, Ltd. Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Aeronautical Engineering & Motor Co., Ltd. [illegible] Park, Bradford "Propellor, Bradford" Bradford 1
Bristol Aeroplane Co., Ltd. The Brooklands Aero Engine Co., Ltd., 112, Great Portland Street, W.1 "Beardmore, London" Gerrard 238
Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London, S.W.1 "Aerofight, Vic, London" Vic 7020
Gordon Watson & Co., Ltd., Westbridge "Merced, Westbridge" Weybridge 550 (7 lines)
Green Engine Co., Ltd., Twickenham Richmond 1705
Gwynne, C. A., Ltd., Hammersmith, W. "Gwynne, Hammersmith, London"
Napier & Son, Ltd., 14, New Bridge Street, London, W. and "Napier, London" Gerrard 8020
Nitrifier, London "Nitrifier, London"
Rolls-Royce, Ltd., 14 and 15, Conduit St., W. "Rolls, London" Gerrard 1634
Sunbeam Motor Car Co., Ltd. Wolverhampton "Mascha, Wolverhampton" Wolverhampton 685
The Gnôme & Le Rhône Engine Co., Ltd., 47, 48, 49, 50, 51, Conduit St., W. "Gnôme, London" Mayfair 4477
Wolseley Motors, Ltd. Adderley Park, Birmingham "Wolseley, Birmingham" Nechells 49

Sheet Metal Pressings—

[illegible] Ltd., [illegible] Aviation Service, London [illegible] Gerrard 1
Arnall & Sons, Lawrence Road, Tottenham, N.15
Blackburn Aeroplane & Motor Co., Ltd. [illegible] Park, Bradford "Propellor, Bradford" Bradford 1
W. H. Bristow & Co., Ltd. Hall Lane Works, Willesden, London, N.W. "Bristow, Kilburn" Willesden 2840

Sheet Metal Work—

The Accles & Pollock Copper and Oil Co., Ltd., 60, Victoria St., Westminster, London, S.W.1 Victoria 1 [illegible]
Arnall & Sons, Lawrence Road, Tottenham, N.15
British Metal Industries, Ltd., Kingston Bridge
Rubery, Owen & Co., Darlaston, South Staffs. H. Sefton & Co., Tottenham Court Rd., W. 1, Albemarle Street, Piccadilly, W. "Sefton, Phone, London" Regent 1181
Arthur H. Tutt & Co., 51, Seymour Road, North Kensington, W. Park 1443
Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines) "Edibrac, Phone, London"

Small Tools

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C.1 "Photosil, Westcent, London" Museum 55

Sparking Plugs—

Edge Sparking Plug Co., Ltd., Rugeley "Ignitor, Rugeley" Rugeley 234
Rushton Spun Plug Co., Ltd. (Wm. Hagel, Ltd. Successors), 8, Bunhill Row, E.C. 1 "Rushton, Reg, London" Gerrard 7,585
Sparking Plug Co., Ltd. "Dart, West Bromwich" West Bromwich 1
Terry, Herbert & Sons, Ltd. Redditch "Springs, Redditch" Redditch 18 (3 lines)

Springs—

Herbert Terry & Sons, Ltd. Redditch "Springs, Redditch" Redditch 18 (3 lines)

Stampings—

Accles & Pollock, Ltd. Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)
Arnall & Sons, Lawrence Road, Tottenham, N.15
Gordon, J. & A. & Son, 30, St. Mary Axe, E.C. 3 "Gordon, Aldgate, London" Avenue 1430
Mossman, J. & Co., 30, Newgate Street, E.C. 1 And at Glasgow City 3115

Steel—

Axon, Ellis & Co., Ltd., Sheffield "Ellis, Sheffield" Sheffield 3607
Firth, John & Sons, Sheffield "Firth, Sheffield" Sheffield 3230 to 3237
Guthrie, J. & J. & Son, 30, St. Mary Axe, E.C. 3 Avenue 1432
Nicklin, Bernard & Co., Birmingham "Bernard, Birmingham" Smethwick 322

Steel Stamps and Markings—

John Morrow & Sons, Cockhill Street, Millwall, E. 14 "Dasher, Phone, London" East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd. Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Tanks & Cowls for Aeroplanes

Zephyr Ventilating Co., Ltd., Tyrpitt Road, Bristol. Telegrams: Zephyr, Bristol.

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

Mossman, John & Co., 30, Newgate Street, E.C. 1 And at Glasgow City 3115

Timber—

Brown, R. F. & F. W., Wellston, near Nottingham "Brown, Nottingham" Nottingham 1526
Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euquare, London" Museum 496
Also at Market Harborough, Leicestershire "Hoptons, Market, Harborough" Market Harborough 13
J. Oxley & Sons, 141, Great Portland St., W. "Buchanan, London" Hop 1 [illegible]

BUYERS' GUIDE cont. on next page

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.
Mann, Egerton & Co., Ltd., 117, Cleveland Street, London, W. Museum 70 (4 lines). Installing, Eusroad.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord, Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston." Bilston 10.

Varnishes—
The British Emaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London" Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers—
Guthrie, J. B & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs— N.15.
Arnold & Sons, Lawrence Road, Tottenham.
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London" Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Wi flector. London." Regent 59
Triplex Safety Glass Co., Ltd., 1, Albemar Street, Piccadilly, W.1. "Shatterlys, Picc London." Regent 134

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury S London, E.C.2. "Setscrew, Finsquar London." London Wall 108
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C. Avenue 143

Wires and Cables
Bruntons, Musselburgh, Scotland. "Wiremi Musselburgh" Musselburgh 2
Cradock, Geo., & Co., Ltd., Wakefield, En land. "Cradock, Wakefield." Wakefield 4

Wirework— (3 line
Terry, Herbert & Sons, Ltd., Reddit "Springs, Redditch." Redditch 6

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdal "Robinson, Rochdale." Rochdale 46
Sagar, J., & Co., Ltd., Halifax. "Sawtoo Halifax." Halifax 1
Wadkin & Co., Leicester. "Woodwork Leicester." Leicester 36

THE CAMDEN CONSTRUCTION CO., LTD.

289, HIGH STREET, CAMDEN TOWN, N.W.1.

CONTRACTORS FOR THE ERECTION OF BUILDINGS

FOR THE AIRCRAFT AND ALLIED TRADES

IN

THE MATERIALS AT PRESENT AVAILABLE WHICH CONDUCE TO SPEED

DESIGNS AND ESTIMATES SUBMITTED PROMPTLY.

By Royal Warrant of Appointment.

ESTABLISHED 1819.

ARNOLD & SONS,

Engineers and Instrument Manufacturers,

Sheet Metal Work, Sheet Metal Pressing, Stamping, Spinning, Acetylene Welding, Nickel Plating, Silver Plating, Electro Tinning, etc., etc.

LAWRENCE ROAD, TOTTENHAM, N.15.

Head Office: GILTSPUR STREET, E.C.1.

Telegraphic Address:—"Instruments," London. Telephone Nos.:—City Office: 5240, 5241, 5242 City. Factory: 2370 & 2371 Tottenham.

BLACK ENAMEL.

AEROPLANE GREY PAINT (flat). Oil and Petrol Resisting.

TRANSPARENT WOOD FILLER.

Subject to A.I.D. Inspection.

HARLAND'S

VARNISHES, ENAMELS AND FINE COLOURS.

By Appointment to His Majesty the King.

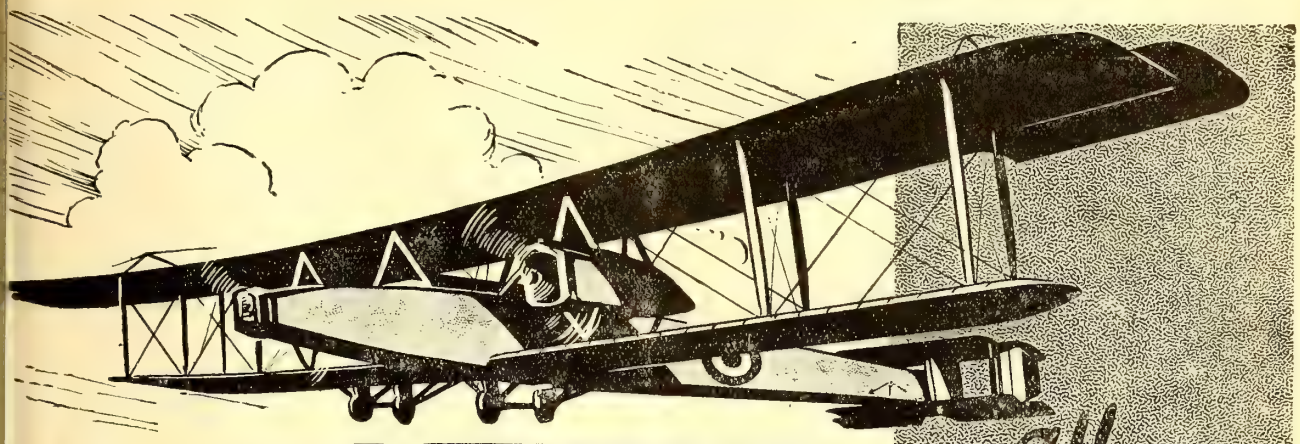
MERTON, LONDON S.W.19.

ESTABLISHED 1791.

COPAL VARNISHES for AIRSCREWS and EXPOSED WOOD PARTS, &c.

WHITE DOPE RESISTING PAINT.

Subject to A.I.D. Inspection.



MANUFACTURERS
of
A.G.S. Shackles
(drop-forgings).

Extensive Stocks of A.G.S. and Admiralty — Aeroplane Parts. —

WHITEMAN & MOSS Ltd

AVON HOUSE, 35, LONG ACRE, W.C.2.

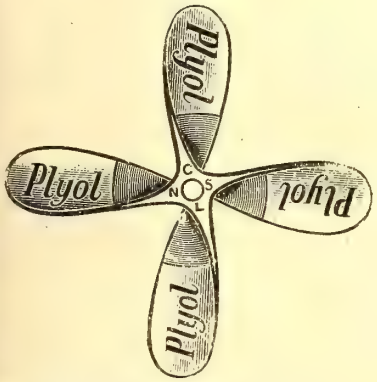
Telephone: GERRARD 2060-1.

Telegrams: "Whitomoss, Rand, London."

All Aircraft Accessories

M. 1.

"PLYOL"
THE
BEST CEMENT
FOR
THREE-PLY,
Veneering, etc.



Registered Trade Mark.

ALDGATE CASEIN WORKS.

NIEUWHOF, SURIE & Co., Ltd.
HEAD OFFICE
5, Lloyds Avenue, London, E.C. 3.

And at
ALDGATE AVENUE, ALDGATE, E.C.

Also Casein especially adapted for Waterproof Paints, Varnish, etc.

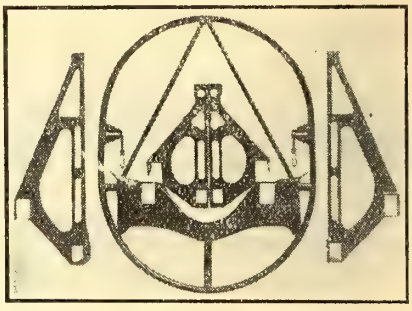
Telephones
AVENUE 34, 35.

Telegrams:
'SURICODON, FEN LONDON."

Sopwith Engine Plates in Stock, Complete Sets.
Speciality Copper Pipe Work.

WRITE FOR PRICES.
THEY ARE RIGHT.





ALL PARTS PASS D A.I.D. AT OUR WORKS.

SWIFT Aviation Ltd.

Contractors to H.M. Government.

'PHONE—
762 KINGSTON.

KINGSTON

'GRAMS—
"SWIFT, KINGSTON."



Tel. phones—Dalston 872. London Wall 9766. Hampstead 4768. Hornsey 1105. Cardiff 2043.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE SAW MILL PLANTS,
—— FOUR OTHER FACTORIES, ——
AND TWO YEARS' EXPERIENCE.

Postal Address only:

141, CURTAIN ROAD, E.C.2.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

HANDLEY PAGE LTD.

CONTRACTORS TO
THE ADMIRALTY
AND WAR OFFICE

CRICKLEWOOD,
LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines). "HYDROPHID, CRICKLE," LONDON



KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

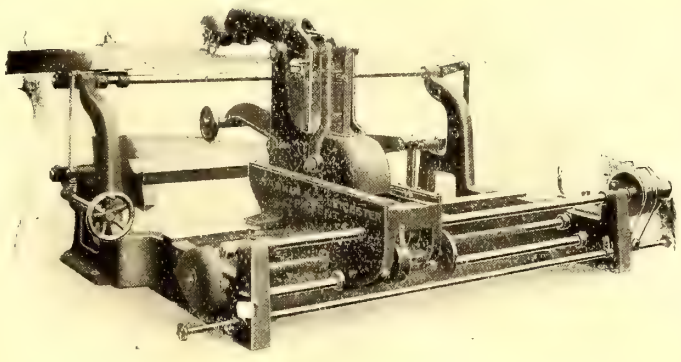
AUTOMATIC PROPELLER SHAPERS.

For Propellers having any number of blades.

Our latest machines have 2 speeds of traverse along the blade, viz.: 3¾in. and 5¾ in. per minute.

An average size propeller can be shaped therefore in 80 mins.

Over 100 of these machines now in commission.



Made in 2 sizes to take propellers up to 12ft. and 14ft. dia.

Either machine deals with propellers 16in. wide and 9½in. deep through hub.

PRICES.

12ft. type.. **£282 10s.**
14ft. ,, **£309 10s.**

An important feature is that WOODEN FORMERS ONLY are required. These can be easily made in your own shop and make the manufacture of small quantities of propellers a paying proposition on our machine.

WADKIN & CO., LEICESTER.

Telegrams: "Woodworker." 'Phone Nos. 3614 and 5.

WARING & GILLOW LTD

Furnishers & Decorators to H.M. the King

CONTRACTORS
TO THE
WAR OFFICE AND ADMIRALTY.

LIVERPOOL HAMMERSMITH LANCASTER

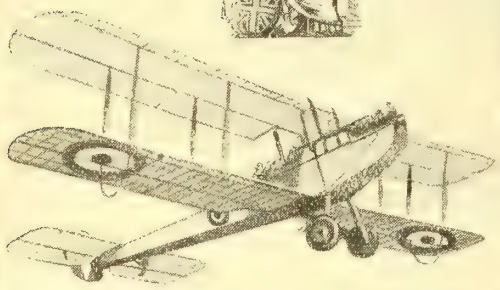
HEAD OFFICE
OXFORD ST. W.1

TELEPHONE No.: **HAMMERSMITH 1980**

TELEGRAMS: **"Warings Factories, Hammersmith."**

Britannia Dope

TRADE MARK

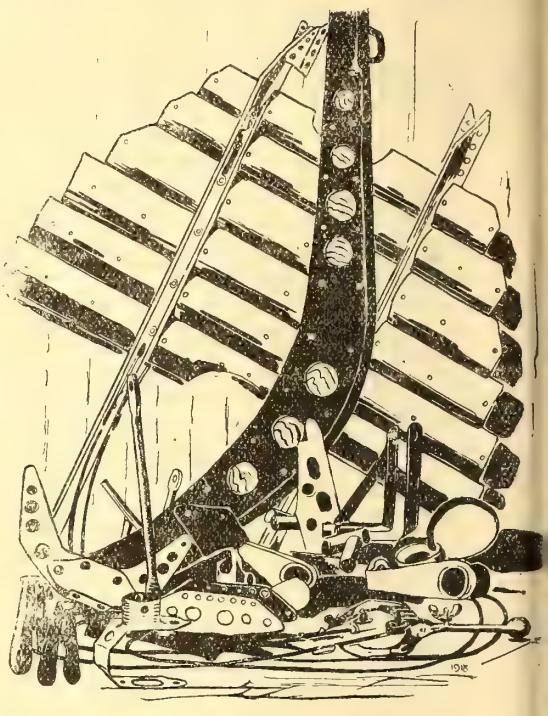


Britannia Dopes
(NON-POISONOUS)
and Varnishes
FOR AEROPLANES
AND SEAPLANES

FOR FULL PARTICULARS APPLY TO THE APPROVED MAKERS—

ROBT. INGHAM CLARK & CO. LTD.
WALTER HOUSE,
BEDFORD ST., STRAND, W.C.
Telegrams: "Pearline, Westrand.
Telephone: Regent 3923.

And at WEST HAM ABBEY, E.15
Telephone ... East 955 & 956



WE cannot illustrate all of the hundreds of small parts we make.

Above we print a small sketch which shows the type of work we do, without indicating exactly the details of the work. It suggests, we think, what we can do for you.

The Pulvo Engineering Co. Ltd
HARRY WHITFIELD, Sole Directo
10, DANE ST., HOLBORN, W.C. 1
'Phone: Holborn 410. Wires: Pulviput, Westcen

PULVO

THE PULVO COMPANY.

. visit to the Pulvo Engineering Company, Ltd., is a very cative experience. Here is a firm doing engineering and al work of the highest description and intricacy and yet the ur ratio is five women to one man. This is a masterpiece in way of women's war work. There are women drillers, rs, riveters, welders and benders, women charge hands, nen super-charge hands, even a works manageress in the on of Mrs. Ernest.

o far as aeronautical work is concerned this firm is a war tion, but one is assured that the policy of the directorate is it shall be a post-war bread and butter industry.

he aviation part of the concern was established soon after outbreak of war by the Managing Director, Mr. Harry itfield, with three girls and one machine. There are now dreds of women employed and every inch of space is fully upied. As a matter of fact, the quarter in which the works situated does not give much encouragement to expansion, this firm has made the most of the available space. The ks have expanded upstairs, downstairs, over the landing, in basement, round the corner, and lately into the main oughfare.

he quality of the work turned out is so high that there no A.I.D. inspection during manufacture. The firm's own ers reject only one per cent. of the finished product, whilst final A.I.D. reception test rejects only a quarter of one cent.—a fact of which the firm may well be proud. All the men employed are far above the average factory worker class, st the majority are good, sound, middle-class women, who happily, conscientiously and efficiently because of the per- l interest which they have in winning the war, and they are tly encouraged by the care evinced by the management for welfare.

r. Laing Whitfield and Mr. Tweddle are joint works mana- , and Mr. Ernest is Production and Progress manager.

he sight that impresses one most is the acetylene welders in room, a sketch of which is reproduced; this is a depart- t which a firm of much larger proportions might envy. re is even a woman "muffler," a job no doubt excellent in winter but seemingly hardly suitable to a woman in the mer months.

his fortunate concern has no shop stewards or strikes, and erate hours pay from a production view point.



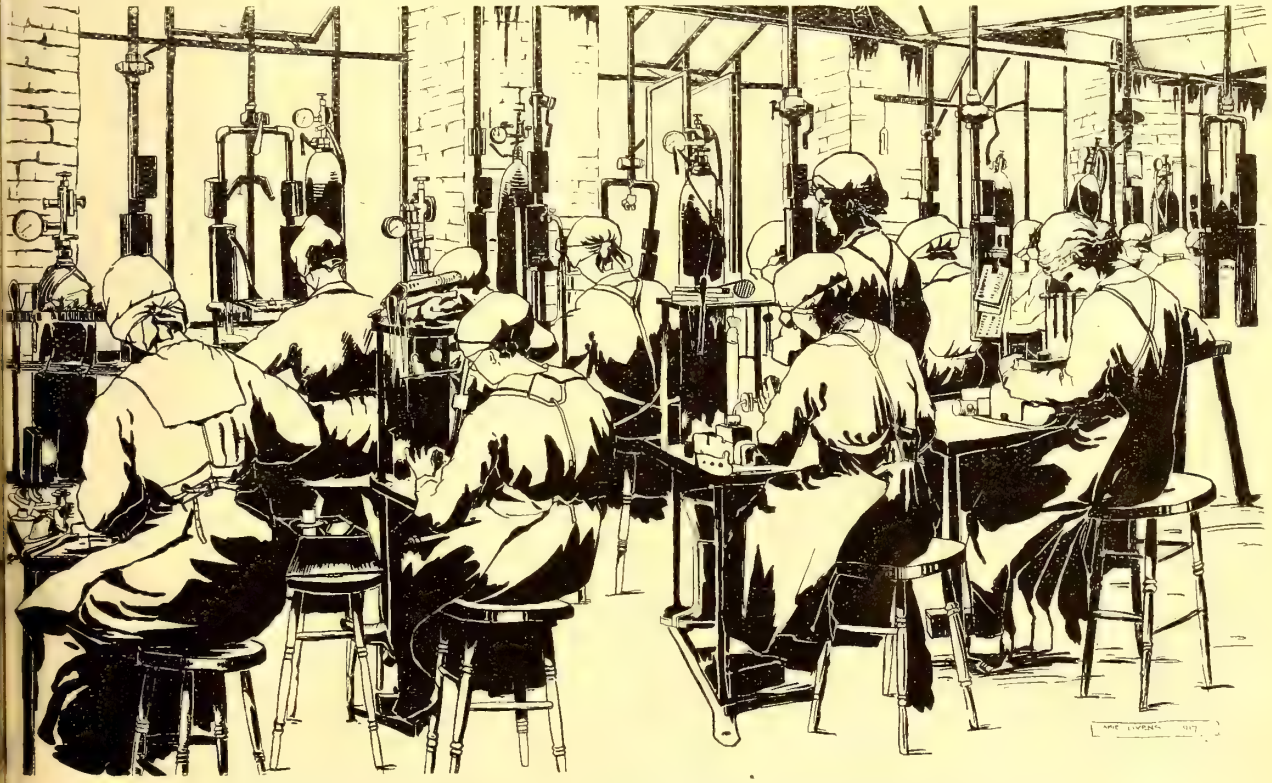
An Impression of a Pulvo operative at a Capstan Lathe.

"AIRCRAFT SUPPLIES."

he fortnightly circulation of "Aircraft Supplies," the House nal of Aircraft Supplies, Ltd., has grown to exceed 1,500 es, although the Publicity Department has "combed out" mailing list no less than three times, and on each occasion reduced the circulation to 1,200. In view of the coming ning of paper, to commence on the 24th of this month, it is necessary for the proprietors to conserve their resources in paper in order to provide for the continued publication of "Aircraft Supplies."

It has been decided to levy a subscription, which can be paid either yearly or half-yearly, and to circulate "Aircraft Supplies" among subscribers only, excepting in occasional instances, where it will be necessary to send out single copies.

The directors of the Aircraft Supplies Company state that the levying of this subscription is made entirely to meet the paper shortage, and that there is no intention whatever to allow any profit to accrue to the company from this publication; it has therefore been decided to make a payment at the end of each six months to the Secretary of the R.A.F. Aid Committee.



An Impression of the Welders at the works of the Pulvo Engineering Co., Ltd.

THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by The Aeroplane from the current Official Patents Records :—

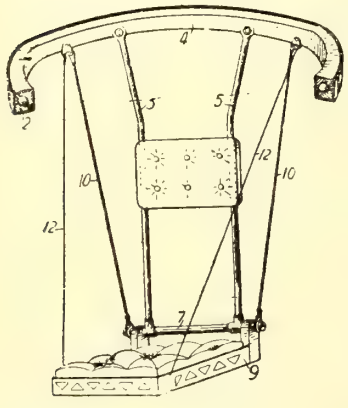
Patent Applications.

Bloomer, F. Box spars for aircraft, etc. No. 9361. June 7th.
Buckham, Sir G. T. Anti-aircraft ordinance. No. 9437. June 7th.
Campbell, F. Aviator's rigging tool. No. 9172. June 4th.
Clerget, Blin et Cie Radial engines. No. 9431. June 7th.
Cullen, W. H. Control levers of aeroplanes. No. 9219. June 4th.
Dunkerley, L. Cutters for machines for forming aircraft propeller blades, struts, etc. No. 9455. June 8th.
Grand, S. E. Parachute device for aeroplanes. No. 9326, June 6th.
Higginbottom, J. Aeroplanes. No. 9089. June 3rd.
Innes, J. Hangars, etc. No. 9117. June 3rd.
Knight, J. Jig for assembling aeroplane wings. No. 9366. June 7th.
Mascord, G. W. Hangars, etc., for aircraft. No. 9337. June 6th.
Mooney, D. J. Fuselages, etc., for aviation. No. 9109. June 3rd.
Napier and Son, D. Doping, etc., fabrics for aircraft, etc. No. 9276. June 5th.
Tellier et Cie, A. Hydro-aeroplanes. No. 9302. June 5th.

Complete Specifications, Accepted, Prints of which can be Obtained on and after June 27th, 1918.

116,108. May 22nd, 1917. Sage and Co., F., and Feary, N.A.T.N. instruments for indicating inclination.
116,149. May 31st, 1917. Baily, A. H. Engine power-transmission for aircraft.
116,166. June 12th, 1917. Taylor, W. Levels for aircraft.
109,436. Aug. 16th, 1916. Soc. Lorraine des Anciens Etblsmt. de Dietrich et Cie de Luneville. Ignition apparatus for aviation engines.

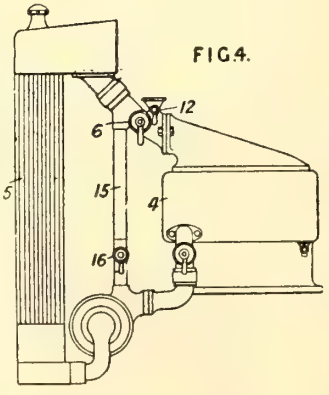
Abridgments of recently published Specifications.



114498. Aeronautics. Bruce, R. A., Verona, West Park, Yeovil, Somersetshire. April 19th, 1917. No. 5512.

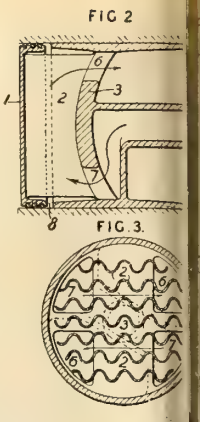
Cars and Cabins.—The seat 9 for the gunner or passenger of a gun-carrying aeroplane is suspended from the rotatable ring 4 carrying the gun mounting by tubes 5 and ties 10, 12. The ring 4 rotates on a fixed ball race 2. The seat is hinged to a cross-tube 7 so that it may be folded up.

114,519. Internal-combustion Engines. Lund, E. K., 8, Swinley Street, Wigan, and Bennett, E., 14, Water Street, Liverpool.

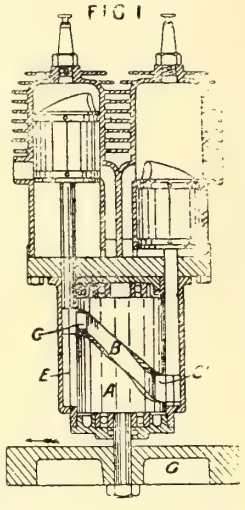


Cylinders, Heating and Cooling.—Cocks 6 are placed in the pipes connecting the radiator 5 with the cylinder jacket 4 so that the latter may be emptied without emptying the radiator and boiling water poured into it through a cock 12 at starting. The cocks 6 may be connected together and to the cock 12, or a three-way cock may take the place of the cock 12 and the upper cock 6. When a pump is employed in the system, its driving gear may be controlled simultaneously with the cocks 6, and a by-pass 15 with a cock 16 may be inserted in the cooling system.

114,528. Pistons. Riedler, A., 7, Rauchstrasse, Berlin, June 11th, 1917. No. 8341.

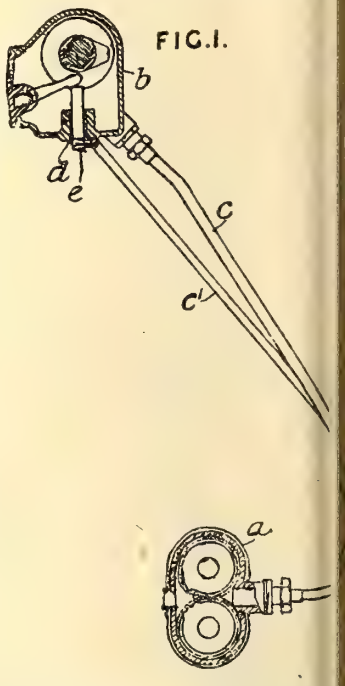


The head 1 of an internal-combustion engine piston is separated by a space from the body 3 and is connected to it by parallel ribs 2 forming channels through which air or explosive mixture is circulated in order to cool the piston. The ribs 2 are preferably corrugated or otherwise formed to increase the cooling surface. The openings 7, 6 for the entrance and escape of fluid are preferably in duplicate, the fluid being arranged, as shown, to flow in two opposite streams. The gap 8 also serves to pick up oil.



114,317. Converting Reciproca into Rotary Motion. Sarro M., 55, Via Palestro, and N longhi, G., 1°, Corso Umb both in Rome. March 22nd, No. 5114. Convention date, 17th, 1917. Not yet acce Abridged as open to inspe under Sect. 91 of the Act.

In an internal-combustion or engine having two or more cylin the piston-rods carry rollers C. engaging an endless helical groo formed on a drum A mounted shaft which runs in ball bearings is fitted with a fly-wheel G. ends of the piston-rods engage g E.

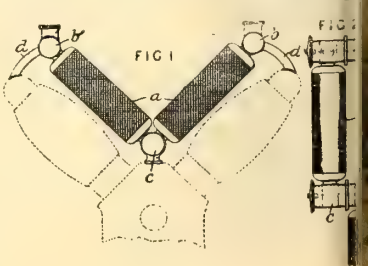


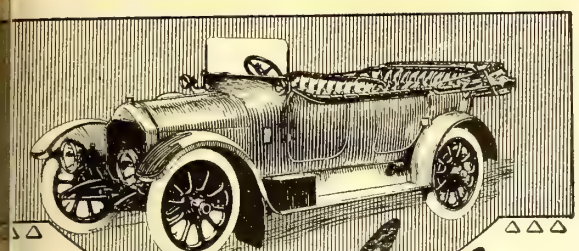
113,742. Lubricating Coatalen, L., and Sunbeam Motor Car Co., Moorfield Works, Wolverhampton.

To prevent the escape of oil from the cam-shaft casing of an internal-combustion engine for aircraft, etc., which is likely to occur through the openings provided for the valve tappets, etc., a pump *a* draws oil or air from the casing through a pipe *c*, and delivers it to the crank chamber. There may be an additional suction pipe c^1 communicating with the glands *d* of the valve tappets *e*. The reduction of pressure in the casing prevents the oil from escaping.

114,869. Radiators for internal-combustion engines. Del L. T., 59, The Avenue, Brondesbury Park, London.

For use with engines having their cylinders arranged V- the radiator is formed in sections arranged as a V so that shall lie between the cylinders. The elements *a*, which ma those described in Specification 112,043, are connected to headers *b* and to a common lower header *c*, the upper headers being connected to the cylinders by junctions *d*. To allow of variation of the inclination of the two sections, the lower header *c* may be formed in sections, the whole





Humber

The Car for which thousands are waiting.

MOTORISTS in all parts of the British Empire are ready to endorse the claims of Humber Cars for reliability, durability and refinement of detail. The reason why many others are compelled to wait for new cars is because our whole resources are requisitioned for War work.

Orders will be executed in rotation.

HUMBER LIMITED, COVENTRY.

Contractors to H.M. Government.

Rotax

Makers of Aeroplane Fittings

Electric Equipment for Heating and Lighting.

Streamline Wires and Fittings.

Prompt Deliveries.

AERO WIND SHIELDS.

"Labyrinth" Relief Valves, Oil and Petrol Fillers, Pressure Pumps, Petrol Filters, Taps and Brass & G.M. Fittings generally.

Water Joint Clips, Turnbuttons, Shackles, and Small P rts.

Prices and Particulars on receipt of Enquiries.

NOTE.—We have an Illustrated Catalogue of our Aeroplane Fittings. Write us and we will send you a copy.

THE ROTAX MOTOR ACCESSORIES CO., LTD.,
WILLESDEN JUNCTION, N.W. 10.

P.C.B.7.

AIRCRAFT SUPPLIES

AN IMPORTANT ANNOUNCEMENT.

BY SALES MANAGER.

The fortnightly circulation of *"Aircraft Suppplies"* has grown to exceed 1,500 copies at the prese time, and although I understand the Publicity Department has "combed out" the Mailing List no le than three times during the last six months, and on each occasion has reduced the circulation to 1,2(the popularity of *"Aircraft Supplies"* makes it almost impossible to meet the demands without allowi the circulation to increase with each issue. While the Directors of *The Aircraft Supplies Company, Lt* are at all times only too pleased to send this publication to anyone in the Aircraft Industry to whom may be of interest, they regret to inform their numerous customers and friends that the time has no arrived when a drastic step has to be taken to keep the circulation as low as possible without deprivi persons to whom the list is essential of receiving copies regularly—also, in view of the coming rationi of paper to commence on the 24th of this month, owing to paper shortage in the country, it necessary to conserve our resources in paper in order to provide for the regular publication of *"Aircr Supplies"* in the future.

To meet these difficulties it has been decided to levy a subscription, and to only circulate *"Aircr Supplies"* among subscribers, excepting in occasional instances where it will become necessary to se out single copies. The subscription of 10s. per annum is not a great charge, and it is felt that if *"Asc House"* issues the Fortnightly Journal and Stock List to subscribers only, no copies will be publish excepting to persons who are using the publication regularly for the purposes of their business a incidentally the continued increased output of Aircraft.

The Directors of *The Aircraft Supplies Company* take this opportunity of informing their ma customers and friends that the levying of this subscription is made entirely to meet the difficulties ou lined above, and that there is no intention whatsoever to allow any profit to accrue to the Compa from this publication; it has therefore been decided to make a payment at the end of each six months the Secretary of the *R.A.F. Aid Committee,* such payment representing the surplus funds in respect the publication of *"Aircraft Supplies,"* which sums will be duly announced in the *Technical Press.*

Commencing with the issue of 30TH JULY, *"Aircraft Supplies"* will only be sent to subscribe but it is hoped that the majority of those names appearing on the mailing list at the present time wi become subscribers. In order to meet the convenience of customers, please note that subscription rat can be invoiced in advance, thus obviating the necessity of firms enclosing Postal Orders or other form of remittance with their subscription papers.

THE AIRCRAFT SUPPLIES COMPANY LTD

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

Representatives in Birmingham, Manchester, Leeds, Glasgow, Newcastle-on-Tyne, Edinburgh, Southampton, Belfast, Cardiff, and the London districts.

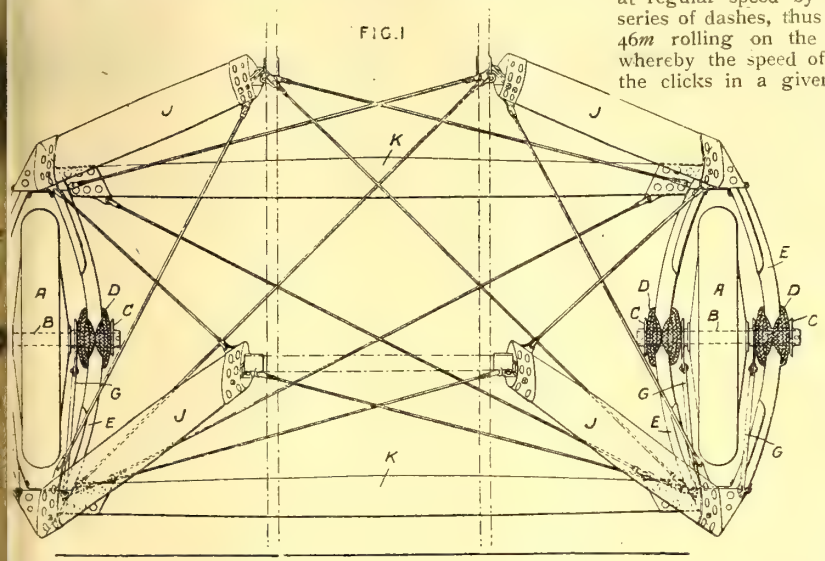
Telegrams: "*Upcast, Rand, London.*" *Managing Director:* G. H. MANSFIELD. *Telephone Gerrard 276.*

ASCOL

held together by a central bolt *e*. A hinged damper may d to the front of the hood to vary the inlet of air.

3. Aeronautics. Chester, W. E., 231, Hammersmith oad, London.

ck of Landing, Deadening; Land Wheels.—The two land A of an aeroplane are carried by separate axles B sup- by rubber shock-absorbers D from bowed frames E which



nnected to the underside of the fuselage by struts J and apart by streamline members K. Radius-rods G connect arings C of the axles to the front ends of the frames E, axles may be guided by vertical guides on the frames.

1. Anti-aircraft Gunnery Apparatus. Harris, F., Manor ouse, Dogsthorpe, Peterborough, Northamptonshire.

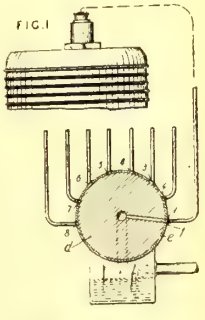
sists in an instrument wherein the movements of an aerial are reproduced to a known scale by an indicator moving horizontal table which is adjustable in height to represent eight of the target. The instrument also comprises a ted chart whereon are indicated the data necessary for ting the gun sights, such as height of target and angle e. In the apparatus shown, the height, angle of site, peed of an aerial target are determined from observations at two stations. The triangle having the target as apex roduced in miniature in the object plane by two rays of produced by pivoted electric lanterns controlled respectively e home sighting-device 10 and by a protractor device 33, 34 is set in accordance with directions signalled from the t station. The home sight 10, the two lanterns 12, 13, he protractor 34 are all mounted in the same plane on an ntal frame or shaft which is rotated by the sight to bring e devices into the object plane. The rays are directed wards on to an horizontal indicator 46 which is adjusted an horizontal table 39, which itself is adjusted in height, the rays fall beyond their points of intersection on two on the indicator spaced apart a distance equal to the distance between the pivots of the lanterns. The adjusted vertical position of the table gives the height of the target, this height being indicated on a graduated chart by an horizontal wire geared to the height-changing mechanism. The angle of site of the target is indicated on the same chart by a vertical wire controlled from the home sight. The indicator 46 may be fitted with a pencil 46*w*, Fig. 11, to trace a graph on a map placed on the table. The pencil is moved up and down at regular speed by clockwork mechanism so that it marks a series of dashes, thus recording the speed of the target. A wheel 46*m* rolling on the table is provided with a clicking device whereby the speed of the target can be determined by counting the clicks in a given period of time. A magnetic and electric device combined with the indicator shows the direction of travel of the target relative to the bearing of the target.

114,724. Clinometers. Miller, A. R., Queensmount, Helensburgh, Dumbartonshire.

A clinometer comprises a casing A filled with liquid and fitted with a scale K, and a buoyant air or gas compartment F, in the form of a segment of a cylinder, and carrying one or more indicating marks, mounted on pivots E coaxial with the cylinder; the compartment F is completely submerged in the liquid and is protected from surface action by a cylindrical shell L having perforations M, N. The casing A has a glazed front B, and the back may also be glazed or made flexible to permit of expansion of the liquid. The instrument may be mounted on pivots in a bracket so that it may hang vertically, the axis of the pivots being at right-angles to the axis of the pivots E.

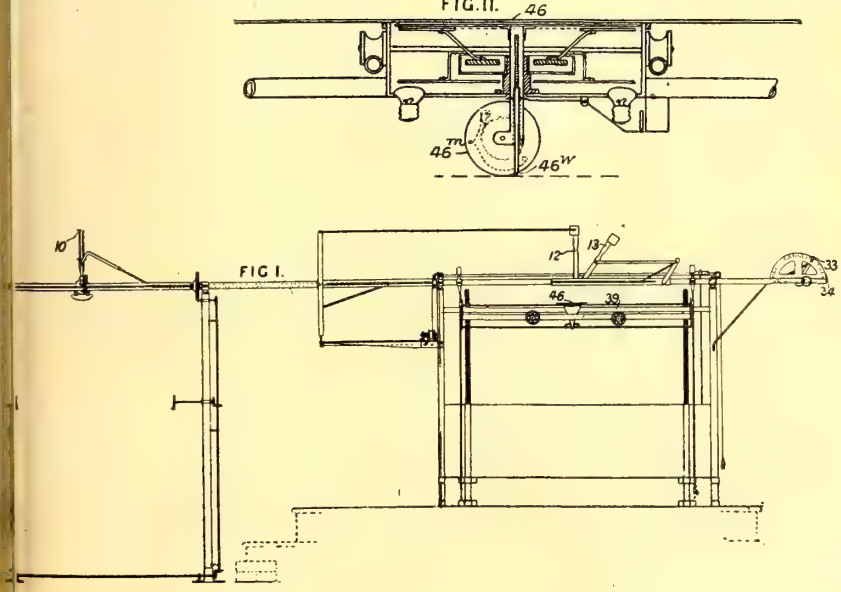
114,698. Sparking-plugs. Matthews, W. C., Lammascote House, Stafford.

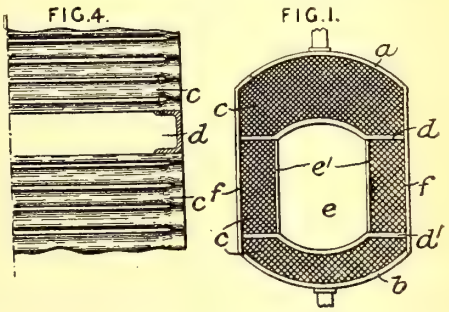
Oxygen is supplied to the interior of a spark-plug by way of a rotary valve *d*, a radial duct *f* in which successively registers with openings in a surrounding sleeve *e*, these openings being connected by tubes 1 . . . 8 to the plugs. The oxygen supply may be arranged so as to draw petrol through with it. A ball valve and sharp edge or other obstruction may be placed in the path of the oxygen, or oxygen and petrol. The apparatus may be warmed by exhaust gas. The inner end of the plug electrode may be closed by a substance such as graphite, which would be forced away by the pressure. The oxygen may be used for starting up a cold engine. Specifications 107,747 and 109,403 are referred to.



114,798. Radiators for aircraft, etc. Soc. Anon. des Etablissements L. Bleriot, 14, Rue Duret, Paris.

Radiators for aircraft engines, etc., having a central opening *e* and upper and lower headers *a*, *b* are provided with intermediate collectors or headers *d*, d^1 extending across the radiator and forming the upper and lower sides of the opening, in place





of an annular collector, as formerly. The cooling elements *c* comprise corrugated plates united at their edges, and the headers *d*, d^1 are preferably formed by front and rear parts of channel section, as shown in Fig. 4, the elements being united to the flanges of the parts. The flanges towards the opening are connected by a plate or sheet to complete the header and form the sides of the opening, and the side walls of the radiator are strengthened by plates e^1, *f*.

THE AIRCRAFT TRADE

MARKET TOPICS.

Prices are for quantities on usual terms.

June 13th, 1918.

COPPER.—This market is very steady and ample supplies appear to be available. The output in April was most satisfactory. The demand, however, was also very high. It is reported that the miners in U.S.A. have sent in a demand for an increase in wages.

Official prices remain unchanged.

TIN.—This market has suffered a collapse and prices both here and in the East have dropped to a more reasonable level. This decline was foreshadowed in these columns quite recently. At the beginning of the week buyers were not eager, but large quantities were bought on the Eastern market when the price dropped. It is very unlikely that there will be a further decline yet. A large business has been done in Straits Tin. Large supplies of Tin are coming forward and there does not appear to be any fear of a shortage being experienced.

Comparative Prices.		Eastern price.
Standard, June 10th	£330	£336
Standard, June 4th	£345	£362
A month ago	£380	
April	£320	

LEAD.—Recent arrivals of Lead have been on the light side. There are, however, good supplies available for national requirements.

Prices remain unchanged.

STEEL.—There are ample supplies of aircraft steel bars available. This cannot, however, be said of sheets. There appears to be an acute shortage of the latter. It is difficult to understand how this has arisen, as we had at one time an apparent glut of steel sheets. The shortage can only be attributed to sheer lack of foresight. It is to be hoped that the authorities responsible will move heaven and earth to get over this difficulty at once, as the next few months will undoubtedly witness an unprecedented hustle in aircraft factories.

Cast Steel and High Speed Steel supplies continue to improve, and prices remain unchanged.

TIMBER.—It is now confirmed that a certain timber is being supplied to constructors for aeroplane construction which will not give anything like the same results as Silver Spruce, and it remains to be seen whether it will prove to be a satisfactory substitute. It is reported that official tests have given satisfaction to official people, but so did other substitutes, since condemned.

The position is certainly a little more hopeful, but cannot be considered very satisfactory. Some of the prices which are being asked for Plywood are simply atrocious, and if one only had confidence in official control of output and supplies, an order from the Ministry controlling this market would be welcomed.

Supplies of Mahogany are a little difficult to obtain.

Official prices remain unaltered.

FABRIC.—Good supplies are still procurable and there does not, at present, appear to be any fear of a shortage.

MONTHLY MARKET PRICE LIST.

June 13th, 1918.

The prices given below are the prices ruling on the above date

Terms.—Usual for the various materials mentioned.

Prices of old metals are as quoted by scrap dealers.

Prices must not be taken as specific quotations for definite quantities delivered to any part of the country.

Aluminium.

Ingot	£225 per ton.*
Remelted	£210 per ton.*

Brass.

Sheets	15¼d. per lb.
Strip	14¼d. per lb.
Wire	14⅝d. per lb.
Tubes	16½d. per lb.
Castings	16d. per lb.
Turning Rod	13½d. per lb.
Brazed Tubes	18½d. per lb.

Copper.

Ingot, Standard, Cash	£110 per ton.*
Ingot, Standard, 3 mos.	£110 per ton.*
Best Selected (net)	£123 to £119 per ton.
Sheets	£149 per ton.
Wire	15½d. per lb.
Tubes, S.D.	19d. per lb.
Tubes, Brazed	19d. per lb.
Rivets	1s. 10½d. per lb., basis.
Tacks	1s. 10d. per lb.

Fabric.

Linen, R.A.F., 17C, Spec., 36 in. wide, 3s. 1d. p. yd.*	
Linen, R.A.F., 17C, Spec., 38 in. wide, 3s. 3d. p. yd.	
Linen, R.A.F. 17C, Spec., 42 in. wide, 3s. 7d. p. yd.	
Spaced, R.A.F., 17C, Spec., 37½ in. wide, 2s. 1d. p. yd.*	

Gun Metal.

Castings, Plain	1s. 8d. per lb.

Lead.*

Virgin Pig	£29 per ton, c.i.f. net.
Virgin Pig	£30 per ton, ex stores net.
Sheets	£39 10s. per ton, D/d. net.
Pipes	£40 per ton net.
Dry White	£46 10s. per ton, less 5 per cent.
White in Oil	£53 per ton (lots over 5 cwt. less 5 per cent.)
Red in Oil	£42 per ton, less 2½ per cent. (lots under 5 cwt. less 5 per cent.)
Red in Oil	£42 per ton, less 2½ per cent.

Nickel.

Nickel	£250 per ton.

Phosphor Bronze.

Ingots, 5cwt. and under	£161 to £186 per ton. (Subject to Copper and Tin Fluctuations.)
Castings	1s. 8½d. to 2s. 1d. per lb.

Phosphor Copper.

Ton lots	£200 to £205 per ton.

Silver.

Silver	48⅞d. per oz.

Solder.

Plumber's	159s.
Tinman's	203s.

Steel.

High Speed, 14 p. cent., Tungsten, 3s. 8d. p. lb., basis	
High Speed, 18 p. cent., Tungsten, 4s. 5d. p. lb., basis	

Alloy Steels to Air Ministry Specifications.

Round and Square :—

Specification No. S2	£86
Specification No. S2 (bright-drawn)	£115
Specification No. S8	£80
Specification No. S10	£70
Specification No. S12	£75
Specification No. S14	£43
Specification No. S15	£70
Specification No. S16	£70
Specification No. S17	£75
Specification No. S18 (oil-hardened)	£86
Specification No. K1	£75
Specification No. K2	£75
Specification No. K3	£86

The above prices are for ¼ in. to 5/16 in. only, other sizes proportionate.

Hexagons.

	.455 and .525	.601 and
Specification S2	£79	£77
Specification S8	£79	£77
Specification S2 (bright-drawn), £112	£112	
Specification S8 (bright-drawn), £112	£112	

Spelter.

English f.o.b., Birmingham	£54-£50

CANNONS' (LINCOLN) AEROPLANE GLUES

"IL PROPELLER" (Cake Glue)
FOR PROPELLERS.

"AERIAL" (Cake Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

"XL" MIXTURE (Jelly Glue)
FOR CLASS 1 WORK (NOT PROPELLERS).

"BI" (Cake Glue)
FOR CLASS 2 WORK.

SOLE MANUFACTURERS:

B. CANNON & CO., LTD., LINCOLN.

LEWIS & TYLOR Ltd.

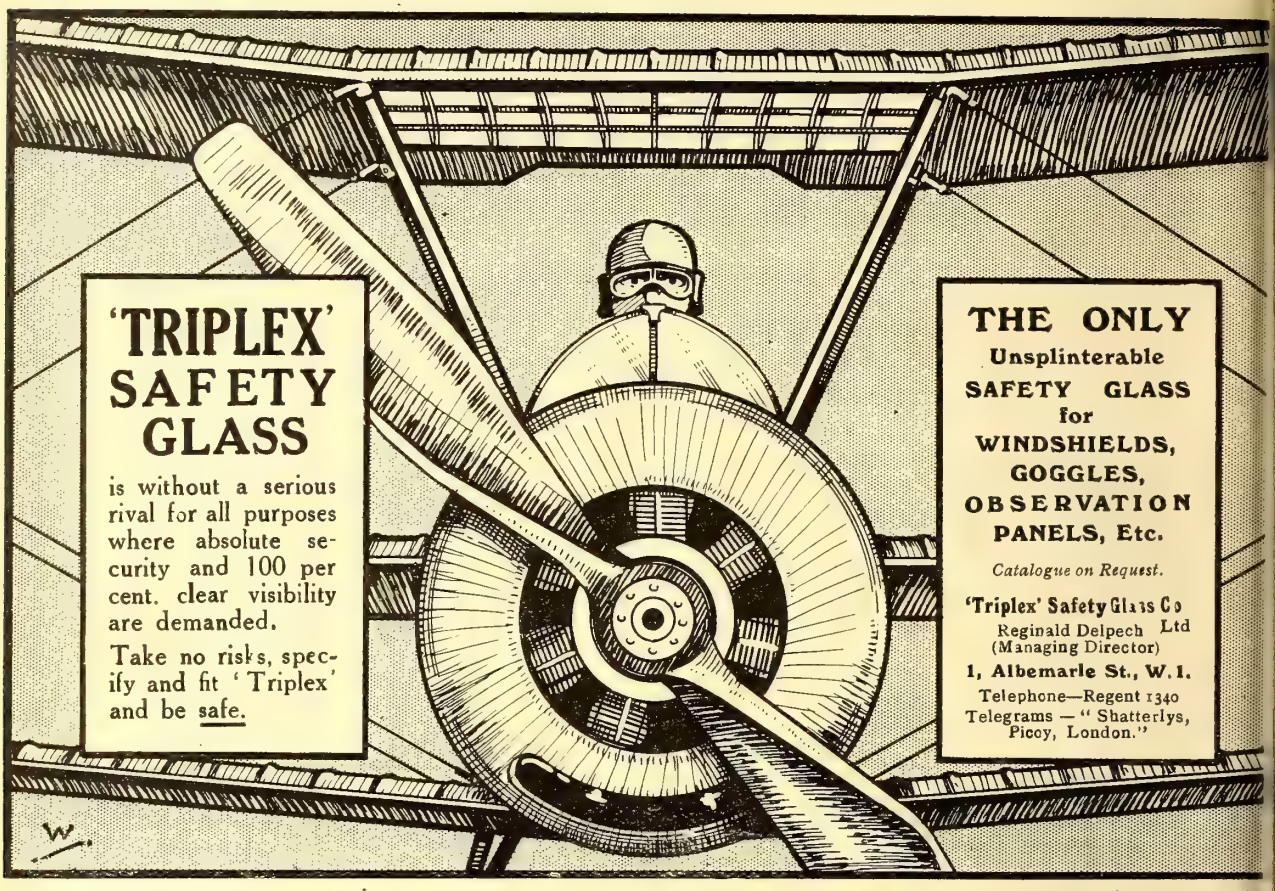
Cardiff and

51, Gracechurch Street, London, E.C.

PATENT **"GRIPOLY"** BELTING

STRETCHLESS, HEAT AND WATER-PROOF
FOR ALL TYPES OF MACHINERY.

BANDS AND WEBBING FOR **AIRCRAFT** LEATHER BALATA AND COTTON BELTING.



'TRIPLEX' SAFETY GLASS

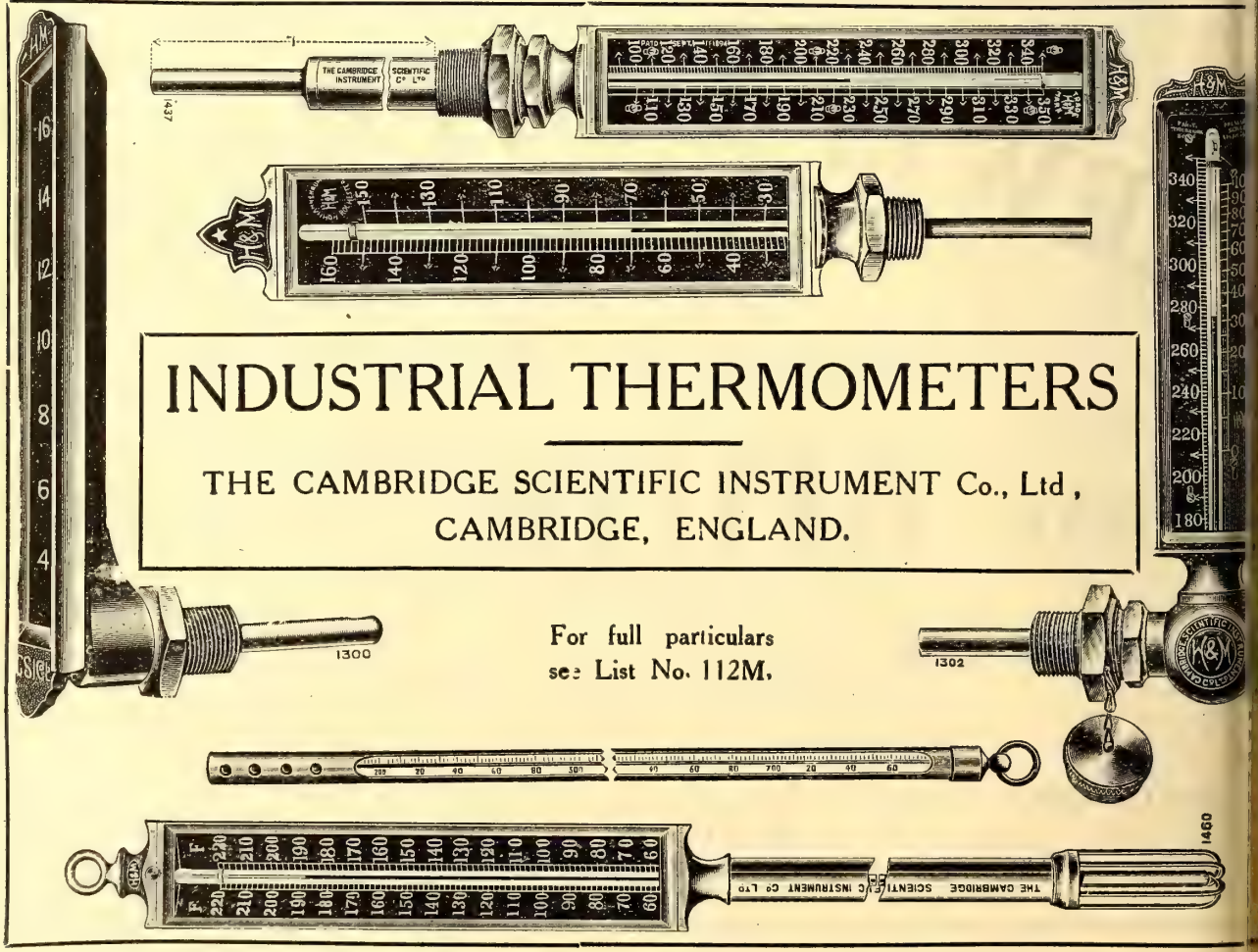
is without a serious rival for all purposes where absolute security and 100 per cent. clear visibility are demanded.

Take no risks, specify and fit 'Triplex' and be safe.

THE ONLY
Unsplinterable
SAFETY GLASS
for
WINDSHIELDS, GOGGLES, OBSERVATION PANELS, Etc.

Catalogue on Request.

'Triplex' Safety Glass Co
Reginald Delpech Ltd
(Managing Director)
1, Albemarle St., W.1.
Telephone—Regent 1340
Telegrams — "Shatterlys, Piccy, London."



INDUSTRIAL THERMOMETERS

THE CAMBRIDGE SCIENTIFIC INSTRUMENT Co., Ltd,
CAMBRIDGE, ENGLAND.

For full particulars
see List No. 112M.

TIN.

Tin	£330

TINPLATES.

Tinplate	33s. 6d., basis, f.o.t.*

TIMBER.†

	Official.
Silver Spruce	10s. 4d. c.f.
*English Ash (selected logs)	7s. 6d. c.f., f.o.r.
English Ash (selected lengths and thicknesses of plank)	10s. 6d. c.f., f.o.r.
Mahogany	1s. 10d. to 2s. 0d.
Walnut	2s. 0d. to 2s. 3d.

For further details see Home-Grown Timber Prices Order, 7.

ZINC.

Zinc Sheets (American).....£100, f.o.b., New York.

ALUMINIUM.

Description.	Price per ton on sale to refiner, delivered at refinery.
Sheet cuttings and rods containing a minimum of 96 per cent. Al.	£160 0 0
Old rolled, etc., containing a minimum of 96 per cent. Al.	120 0 0
Spinnings, punchings, and thin small scrap; also painted and varnished scrap that needs melting, containing a minimum of 96 per cent. Al.	105 0 0
Lump scrap from aero castings and material of equivalent value, containing 87 to 95 per cent. Al.	100 0 0
Turnings and Swarf, generally containing 87 to 95 per cent. Al.	87 10 0
Scrap, generally containing 80 to 86 per cent. Al.	80 0 0
Swarf and inferior Swarf, generally containing below 80—86 per cent. Al.	70 0 0
All Scrap, containing below 80 per cent. Al., not to exceed	65 0 0
All Swarf, containing below 80 per cent. Al., not to exceed	60 0 0

SCRAP MATERIALS (LONDON PRICES).

Brass, Heavy Selected	£90
Copper, Clean	102
Copper, Brazery	80
Gun-metal, Scrap	130
Lead, no Draft	26
Zinc, Old	42

Official Prices.
Includes Selection and Delivery.

ROLLS-ROYCE REWARDS.

the King's Birthday Honours, Mr. A. Wormald, the Works nager of Rolls-Royce, Ltd., was created an Officer of the ish Empire and Capt. L. W. Cox, the Head of Rolls-Royce don Sales Room, who is serving with the A.S.C. in Egypt, given a Military Cross.

AERO COVERINGS, LTD.

The writer recently had occasion to pay a visit to Aero erings, Ltd., an establishment situated in North-West don, whose functions begin where other firms have left This firm is of unique interest to the Aircraft Industry in it is the only firm who have made a speciality of covering doping planes. As long as fabric and dope remain com- ent and indispensable to the complete unit, so will the ortance of this concern increase.

needs but little knowledge to realise that covering and ing are arts and crafts outside the ken of the ordinary ineer. The man or the firm who has specialised on metal k or woodwork must necessarily be in the kindergarten when dope question arises.

nd there is another view to take. The establishment of a ic room on a sufficient size means the expenditure of several dred pounds whilst the establishment and installation of a e room also runs into hundreds of pounds, also there is the r space or a acreage involved, which demands great attention, ticularly if the factory is situated in or near a populous rict. Looking at the proposition, by and large, it would n to be a commercial proposition for one firm to concentrate specialise on this sort of work.

nyway Aero Coverings, Ltd., have found that an increasing ber of firms are willing to take advantage of the facilities offer and certainly as far as one could see, the motto ned to be "full steam ahead." Except for the engineer and two assistants, the entire staff are women and are one and all imbued with esprit de corps.

Aero Coverings, Ltd., are one of the few firms that have successfully solved the application of the dope-by-spraying problem. One say, lying idle, one of the old-time sprayers, a complicated affair, composed of a revolver-like gadget, several lengths of tubing, gauges, a compression container and an overall stand. Then one was introduced to the firm's own sprayer, a very simple device, working efficiently and without complication. One is not allowed to say more at the moment, as it is shortly to be produced in quantity and sold as a marketable proposition, which it certainly is.

SAGECRAFT.

Fredk. Sages, of Peterborough and London, who have won a prominent position in the aircraft world, have suffered quite a loss at the departure of Mr. Dudley, foreman of their erecting shops. He has obtained a post worthy of his ability as works superintendent with an important firm on the South Coast. He was the recipient, at the hands of Mr. Gordon England, general manager of the Aviation Department, of a gold watch, a suit case and a silver case as parting tokens of esteem from his colleagues.

The following changes are announced in "Sagecraft," the firm's house organ:—Mr. Harper, late foreman of the Walton metal machine shop, has left for a new position and Mr. J. Hancock has returned as foreman of the same shop. A new stores foreman, Mr. R. Scott, has been appointed.

THE NORMAN THOMPSON FLIGHT CO., LTD.

It is a matter of common knowledge now that there has lately been a change in the financial control of the Norman Thompson Flight Co., but one is pleased to state that this firm will continue to carry on its work, certain substantial orders having been received. This must be exceedingly gratifying to the directors and employees. Directors like to feel that their efforts are successful and appreciated, whilst employees like to know that their work has not been in vain, especially when much of it is research or experiment.

Writing apropos the Norman Thompson Flight concern reminds one that Mr. G. H. King, late of this firm, is still alive and active. He is, I understand, now in charge of the progress and external contracts of A. V. Roe and Co., Ltd., at Southampton.—F. W. N.

MAGNETO FELICITY.

The spirit of goodwill and mutual understanding existing among the leaders of the British Magneto Industry was very manifest at a gathering which followed the annual general meeting of the British Ignition Apparatus Association. Mr. Ernest Garton, who has acted as honorary secretary of the Association from its inception, was entertained at dinner by the members and presented on their behalf by the Chairman, Mr. Peter F. Bennett, with a token of appreciation and thanks in the form of a handsome grandfather's clock, doubtless to demonstrate to his grandchildren what he did in the Great War.

AN OLD HAND.

All old members of the Aircraft Industry will be interested to learn that Mr. "Bill" Law is now at the Beatty Aircraft Works. Mr. Law was for so long with the Grahame-White concern that it seemed impossible to imagine the factory without him, and when he left last September he was re-installed in October. However, as is the way with all good men, he found wider scope for his activities and appreciation of his unique experience.

OUR CONTRACTORS.

At London Sessions, on June 12th, Robert Scott, 17, engineer, pleaded guilty to unlawfully receiving a quantity of tools, the property of Edward Albert Boynton, and stolen by one of the latter's employees.

Mr. St. John Hutchinson (defending) asked the Court to take a merciful course. Prisoner left the Hugh Myddelton School when 14 years old, and entered Boynton's employ. He displayed such engineering skill as to earn 35s. a week. He left, and although only 15 years old, he and another boy took a back room and began to make nuts and screws for machinery. The business was a success, but the partner, on reaching the age of 18, had to enter the Army, and prisoner kept it on.

He did so well that he took large premises, rented at £130 a year, and employed eight women and eleven men. Of the profits he had spent £400 on machinery, and invested a fair amount in War Stock. At the time of his arrest he was holding large contracts from the Government in connection with aeroplane work. He was undoubtedly a youth of exceptional ability, and would appear to have a good future before him.

Sir Robert Wallace said it was regrettable that such marvellous gifts had been used so badly. He would give him another chance, and bind him over to come up for judgment if called upon.

Seaplanes and Land Machines

Contractors to
THE AIR COUNCIL.

The BLACKBURN
AEROPLANE and
MOTOR CO., LTD.,
LEEDS.
And at Hull.

"Always at the Front."

Blackburn AIRCRAFT

Steele's Ad.

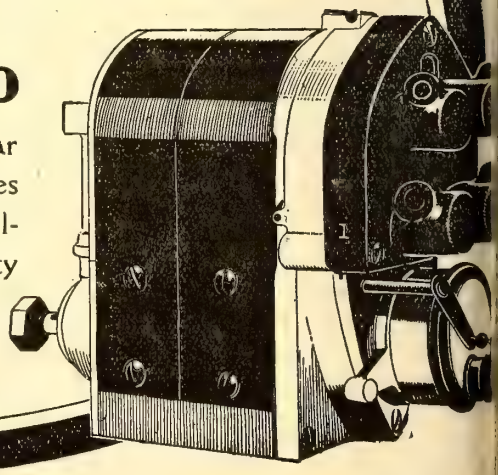
B T-H

All the good features

of former magnetos, with added improvements based on our unrivalled manufacturing experience in the production of the highest quality electrical plant, is embodied in the

B.T.H. Magneto

The present output is requisitioned for war purposes. When the war is won, supplies will be available for those desiring All-British magnetos of the highest quality and proved reliability in service.



THE BRITISH THOMSON-HOUSTON CO.LTD.,
Electrical Engineers & Manufacturers.
Lower Ford Street, Coventry, England.

Member of the British Ignition Apparatus Associatio

AIRCRAFT FINANCE

CURRENT TOPICS.

Treasury's Action Successful.

ar financing is now assuming a most interesting phase. sequent upon the suggestion of the Treasury, the maxi- 1 rate of interest, offered by the banks of every calibre, ie and Colonial, Anglo-Foreign and Discount, for money on sit is 3 per cent. Hitherto, many traders found it conve- t and profitable to lend surplus funds not needed for, say, a le of months or so to their bankers on "fancy" terms.

Money That Shirks.

o doubt this change will be inconvenient to many, yet, at th e time, it must not be overlooked that the company with a nable quantity of money lying fallow for a few months can y purchase Treasury Bills, either new or secondhand and uring at practically any date required, on terms offering more the deposit rate of 3 per cent. Of course, the objective of the ent action is to drive into war financing surplus money h is really shirking. If the scheme is to be properly effective w modifications seem necessary: then the business man will little to complain about.

Aircraft Shares Strong.

rcraft and kindred shares continue to absorb considerable ition due to the knowledge that profits are being constantly nented. There are possibilities, therefore, not only of nced dividends, but in some cases of bonuses arising out of capitalisation of reserve funds.

the case of Aircraft Manufacturing Company "B" Par- ating Preference shares it seems to be expected that the pany should be in a position to pay an extra dividend of thing like 7 per cent. in respect of the participating rights, and above the fixed 7 per cent. cumulative dividend.

The Dividend Expected.

his, of course, is simply what the Stock Exchange expects. ther these expectations will be realised remains to be seen. way the shares are standing about 23s. 6d. each, so that speculative investor is really not paying much for the ibilities. Of course it must be realised that the company has vn to its present dimensions as a result of the war, and it will fare when peace conditions return must be argued " according to taste," as the culinary recipes put it.

What is said about Triumphs.

nsiderable interest is being taken in the shares of the mph Cycle Co., which is now concerned with aeroplanes as as with cars or cycles. The £1 shares are being bought up 3s. on the belief that the dividend results, due for announce- three months hence, will be very satisfactory. The com- has certainly been very generous to the shareholders ng recent years. Indeed, it capitalised a portion of its re- fund last year. This resulted in a bonus of two new es in respect of each share held in addition to the cash divi- of 15 per cent. As a result of this operation the capital is £240,000; but, even on the higher capitalisation, it is said the dividend in respect of the current year will be at least ntained at 15 per cent.

New Magneto Company's Results.

is rare that promises made in prospectuses are fulfilled. etimes there is an immense gulf between the promises and real performance; sometimes the difference is small. The al results of the Fellowes Magneto Co. covering a period of teen months to December 31st last are not so good as was shadowed. For the period in question the net profits before ving for depreciation, were £12,900, or the rate of £8,600 ar, whereas the prospectus foreshadowed a net profit when company settled down to its full capacity of £30,000 after iding for excess profits.

Government to Help.

l things considered this is not so bad, and in any case the r cent. participating preferred shares receive a little extra the ordinary get 15 per cent. dividend for the eighteen ths. The Government is considering proposals for the rgement of the company's production. Regarded in con- tion with the results of some other undertakings it would gest that this country is securing a strong position in the magneto business; let us hope it will be maintained if ever there is a renewal of German competition.

Gnome and Rhone.

A dividend of 300 francs per share by the Gnome and Rhone Motor Company is being talked of in French financial circles. The profit for 1917 is stated to be 7,686,514 francs in comparison with 14,283,848 francs for 1916, and including the balance brought in there is disposable surplus of 8,017,905 francs against 14,756,391 francs a year ago. The dividend named would involve 4,425,000 francs.

Excess Profits in France.

By the way one does not hear much about the harvest being reaped by the French Government out of war profits. An instructive and interesting commentary thereon is provided in the annual report of that big armament concern of France named the Hotchkiss Co. As from November last when the law became operative the company will strike its profits after allowing an extra 10 per cent. for any increase in expenditure, and the result will be divisible as follows:—45 per cent. will be handed over to the State, 45 per cent. will go to the company for division amongst the shareholders and the balance of 10 per cent is to provide a Benevolent Fund for the workers. Of course the State would not share in any possible loss.

A Wise and Pleasant Practice.

Incidentally, in respect of last year's working, a dividend of 100 per cent. was distributed, in comparison with 75 per cent. In addition, however, some of the reserve funds were capitalised and provided a bonus to the shareholders, who received a new share gratis in respect of each share held. This pleasant practice of capitalising the reserve fund is becoming quite common in the French industrial world: in many cases circumstances justify the procedure.

More Capital for Aero Engines.

The Rochet-Schneider Co., another important French armament concern, is increasing its capital, and dividing amongst its shareholders its Special Contingencies fund. The additional capital is needed in order to cope with the construction of aero engines and other war work. There are to be offered to the shareholders 50,000 shares of 100 francs each at par in the rate of two new for each old share. To help subscribe for these a sum estimated at 80 francs will be distributed out of the fund named at the same time as the dividend of 25 francs.

Aeroplanes and Furniture.

It is not without interest to record the fact that Waring and Gillow, the furniture and store people, are actively concerned in the output of aeroplanes. During recent weeks there has been quite a lot of speculation in the company's shares, not prompted by the knowledge of the aeroplane work, but by a belief that the financial position has undergone a material improvement. No doubt this is true, but it is questionable whether the improvement fully justifies the rise in the preference shares. Financially the record of the company has been far from brilliant, probably because of excessive capitalisation or because of a too ambitious programme, or both. Incidentally one notes with interest that Mr. S. J. Waring, who has long been identified with the Oxford Street Stores, is also pecuniarily associated with aviation ventures

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

The files of the following new companies are available for inspection at Somerset House.

Whitworth Engineering Co., Ltd.—Private company. Registered May 30th. Capital £20,000 in £1 shares. To take over the business of engineers, makers of aeroplanes, engines, motors and machinery used for aeroplanes and motor cars, etc., formerly carried on by the White Engineering Co., Ltd., and recently by H. Whitworth. The subscribers (each with one share) are:—

R. Cooke, 63, Parliament Hill Mansions, N.W.5, secretary.
W. H. Roslington, 15, Mill Lane, West Hampstead, N.W.6, accountant.

H. Whitworth is a permanent director. Solicitors: Woodcock, Ryland and Parker, 15, Bloomsbury Square, W.C.1.

METALLURGISTS, LTD.—Private company. Registered May 31st. Capital, £12,000 in 6,000 7½ per cent. tax free participating preference shares of £1 each, 5,000 ordinary shares of £1 each and 10,000 deferred shares of 2s. each, to carry on any business in connection with processes for depositing metals on internal combustion engines and manufacturing such engines and their component parts, etc., and to adopt an agreement between Sherard Cowper Coles and J. Porter. The subscribers (each with one ordinary share) are :—

Sherard Cowper Coles, Sunbury-on-Thames, metallurgist

J. M. Cobbam, 33, Southampton Street, W.C.2, solicitor.

The first directors are :—Sherard Cowper Coles (technical director) and Gustave E. de Brunner (administrative director). Qualification, £100. Registered office : 35, Long Acre, W.C.2.

NATIONAL SPRING CO., LTD.—Private company. Registered May 31st. Capital, £1,000 in £1 shares. To take over the business of a spring manufacturer carried on by J. A. Harvey at Fountain Works, Fountain Lane, Oldbury (formerly at Spon Lane, West Bromwich); also to carry on the business of manufacturers of and dealers in accessories to hydraulic, pneumatic, aerostatic or general engineering, etc. The subscribers (each with ine share) are :—

W. P. Ford, 169, George Road, Erdington, Birmingham, engineer.

J. A. Harvey, 102, Spon Lane, West Bromwich, spring manufacturer.

The first directors are :—J. A. Harvey and W. P. Ford. Registered office : Fountain Works, Fountain Lane, Oldbury.

BISHOPSDOWN PROPERTY CO., LTD.—Private company. Registered June 1st. Capital, £250 in 1s. shares. Hotel, restaurant, tavern, refreshment room and lodging house keepers, licensed victuallers, club proprietors, owners or lessees of a golf course *and aviation ground*, property owners, theatrical and opera box office proprietors, entrepreneurs, general agents, etc. The subscribers (each with one share) are :—

Isabel B. Hancock, The Spa, Tunbridge Wells, hotel manageress.

Grace E. Marshall, 17, Grosvenor Park, Tunbridge Wells, solicitor's clerk.

The first directors are to be appointed by the subscribers. Registered office : The Spa, Tunbridge Wells.

[It appears that the £250 will be kept busy.—Ed.]

J. A. PRESTWICH AND CO., LTD.—Private company. Registered May 30th. Capital, £200,000 in 50,000 6 per cent. cumulative preference and 149,500 ordinary shares of £1 each and 10,000 management shares of 1s. each. To take over the business of an engineer carried on by J. A. Prestwich at Northumberland Park, Tottenham, as "J. A. Prestwich and Co."; also to carry on the business of motor, cycle, engine, chassis, aeroplane, rolling stock, agricultural implement and munition manufacturers, electrical engineers, etc. The subscribers (each with one ordinary share) are :—

J. A. Prestwich, Roseneath, Woodside Avenue, Muswell Hill, N.10, engineer.

A. Willmott, Oakfield, Redhill, C. A.

The first director is : J. A. Prestwich. Qualification : £100.

BERTRAM ISON, LTD.—Private Company. Registered June 11th. Capital, £5,000 in £1 shares. To take over the business of a company of the same name and that of Cons and Cons, Ltd., or of the liquidator thereof, as pianoforte and musical instrument manufacturers and dealers, etc. Power is also taken to manufacture aeroplanes and accessories, etc. The subscribers (each with one share) are :—

B. Ison, 1, Chatsworth Road, N.W., pianoforte manufacturer.

W. Blair, 98, Wilberforce Road, Finsbury Park, N.4, company secretary.

Permanent governing director : B. Ison. Solicitors : Neve, Beck and Kirby, 21, Lime Street, E.C.

BRUSH ELECTRICAL ENGINEERING COMPANY, L

The 29th General Meeting of the company was held June 17th at the Manchester Hotel, Aldersgate Street, Mr Garcke (the chairman) presiding.

The Secretary (Mr. F. M. Hodson) read the notice conve the meeting.

The Chairman said that the year under review had been of considerable activity in all departments of the comp works. Notwithstanding the difficulties of manufacture, d shortage of labour and materials, the output—measured in m value—constituted a record. On their engineering side there been a sufficient and increasing demand for their star products for war services to keep the shops well employed. the rolling stock side their standard business had, however, practically at a standstill, all their resources in the woodwo shops having been devoted to another product, in which they been particularly successful.

The demand for Brush Ljungstrom turbo-generator sets auxiliaries had increased so rapidly that to keep pace wi they had been compelled to arrange for a large extension of machine tool equipment. Notwithstanding the difficulties of ducing a new system of ship propulsion at the present time, friends, the British Ljungstrom Marine Turbine Company, controlled the marine propulsion rights of this turbine, had excellent progress, and details had recently been publish the first British-built vessel equipped with plant of this Other important similar orders were now in hand. With r to the excess profits duty, he observed that the present high tion of profits would not favour the increase of capital would be so greatly needed after the war.

After referring to the profits and to the proposals for d with them, as set out in the report, he said that the stockh would be asked to authorise the directors to postpone the pa of the dividend on small fractional holdings. The portion dividend so postponed amounted in the aggregate to only but as in fact they were held by over 1,100 members it wo appreciated what a large amount of clerical work and ex would be saved if the dividend on these fractions was post

The Board did not propose anything more than a postpon pending the preparation of a scheme enabling members t their fractional holdings, or to buy further stock, and thu vert their holding into whole amounts of not less than If the stockholders approved, a circular embodying such a s would be issued a little later. In conclusion, he move adoption of the report and accounts

Mr. B. S. Broadhurst (managing director) seconded the m which was adopted, and the proposed dividend at the r 6 per cent. per annum on the Ordinary stock for each years 1916 and 1917 was confirmed. A resolution was also to the effect that payment of the Ordinary stock divide holdings of less than £10 and on fractions of less than £ by holders of £10 and upwards be postponed.

POSTAL SERVICES.

According to the "Petit Journal," a proposal to establis aerial postal services—namely, between Paris and St. N and between Paris, Marseilles and Nice—is under conside

HYDROGEN SUPPLIES.

The Admiralty have ordered that until further notice the facture, sale, and supply of compressed hydrogen in the U Kingdom shall be regulated in accordance with such directi may from time to time be given by the Deputy Controll Armament Production, Admiralty.

No person or company manufacturing or supplying comp hydrogen shall sell or supply it otherwise than to such pers companies and in such quantities as the Deputy Controller direct. All persons and companies manufacturing or sup free or compressed hydrogen for sale or for their own use o by-product are required to furnish the particulars specified schedule to the Order before June 25th, and shall render returns as the Deputy Controller shall direct.

CURRENT SHARE QUOTATIONS.

June 18th, 191

Aircraft Mnfg. Co.	7% cum. pref. £1 ...	22 6	23 6
	7% cum. & ptg. "B" pref., (fully paid)	21/6	22 6 x
Armstrong (Sir W. G.) Whitworth & Co., Ltd.	4% cum. pref £5...	3 7/16	3 9/16
	5% 2nd. pref. £1 ...	17/-	18/-
	£1 ordinary	41/6	42/6
Austin Motor Co., Ltd.	7% cum. pref. £1...	17 6	18/6
	£1 ordinary	26/-	27/-
Birmingham Small Arms Co., Ltd.	£1 ordinary	67/6	68 6
	5% cum. "A" pref.	4	4⅛
	6% cum. "B" pref.	20 6	21/6
Boulton & Paul, Ltd., 5% cum. pref. £1		¾	⅞
Brown Bros., Ltd., 6% cum. pref. £5...		4	4½
Darracq (A) & Co., (1905) Ltd.	£1 ordinary	28 6	29 6
	7% cum. pref. £1	19/6	20 6
Electric Construction Co., Ltd.	7% cum. pref. £1 ...	19 6	20/6
	£1 ordinary	23/6	24/6
Fellows Magneto Co., 8% cum. partip. pref.		17/-	18 -
General Electric Co., Ltd.	6% cum. pref. £10 ...	10	10⅛
	£10 ordinary	21¼	22⅛
Gwynnes, Ltd., 5% cum. pref.		5⅜	5⅝
Ordinary		36/-	37/-
Greenwood & Batley, Ltd., £10 ordinary		13½	14½
Humber, Ltd., 6% cum. pref. £1		15 -	16/-
£1 ordinary		22 3	23/3
Napier (D) & Son, Ltd., 7½% cum pf. £1		19/3	20/3
£1 ordinary		32/-	33/-
Peter Hooker, Ltd., £1 7% cum. partic. 1st pref.		18/6	19 6
Rolls Royce, Ltd.. £1 ordinary		38/-	39 -
Rudge Whitworth, Ltd. £1 ordinary ..		41/6	42,6
Ruston, Proctor & Co., Ltd.	£1 ordinary	1 9/16	1 11 16
	5% cum. pref. £1 ...	17	18/-
Sunbeam Motor Car Co., Ltd., £1 ord.		3 11 16	3 15/ 6
Straker Squire, Ltd. (1913), £1 ordinary		21/-	22/-
S. Smith & Son, Ltd. (Motor Accessories) £1 ordinary		26 6	27 6
Triplex Safety Glass, £1 ordinary... ...			26
Vickers, Ltd., 5% pref. stock...			
5% pref. shares. £1 ...			17
£1 ordina y			42
Wm. Beardmore & Co., Ltd., 6% c. pf. £1			18

GENERAL INFORMATION.

Armstrong, Whitworth (1916)
Austin Motor (1916)
Rolls Royce (1916 & 1917)
Rudge Whitworth (1916 & 1917
Smith (S) & Sons (1917)
Straker-Squire (1915)
Sunbeam Motor
Thorneycroft (J. I.) & Co.
Vickers (1916 & 1917)

Owing to t culty of est liabilities Finance a nitions A accounts be ready later date

x—ex dividend

NAPIER

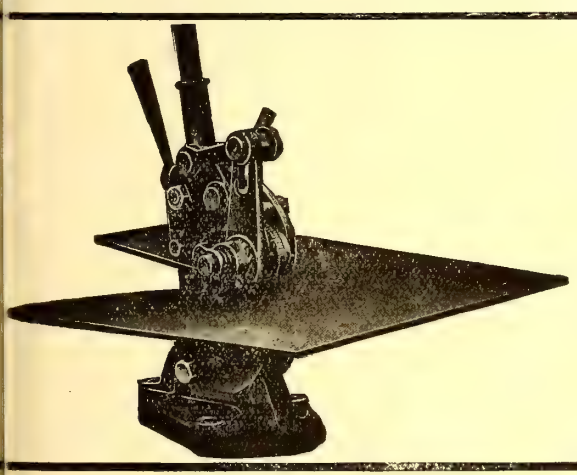
AERO ENGINES AND AIRCRAFT.

Contractors to H.M. Government.

D. NAPIER & SON, LIMITED.

Registered Offices:
Acton, W.3.

Showrooms:
14, New Burlington Street,
London, W.1.



'TANGENT'

PATENT HAND

SHEET SHEARING MACHINE

SELF-FEEDING, FAST CUTTING.

STEEL, 3/16 SOFTER METAL, 1/4.

Sample Tool sent on approval

Write for Descriptive Pamphlet and Prices.

MONTGOMERY, SMITH & Co., Ltd.,

PATENTEES AND MANUFACTURERS,

KEYNSHAM, SOMERSET.

"ULSTER" FANS

FOR ALL PURPOSES.

Forced and Induced Draft on Boilers. Fumes Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. **Hot-Water. Steam. "Ulster" Stoves.**

We Guarantee Success. Our 50 years' experience is at your disposal.

MUSGRAVE & CO., Ltd.,

Manufacturing Engineers,

BELFAST, LONDON, MANCHESTER, CARDIFF.

(Continued from page 2248.)

Parmelee, W. S. Phelps, A. R. Quirk, S. S. Rackrowe, C. D. Reid, C. N. Reinhardt, R. M. Rodgers, M. R. Shier, J. F. Stafford, Jr., M. A. Jordan, April 18th; C. A. Echlin, G. E. Douglas, C. A. Denzel, P. S. Crovat, O. S. Clefstad, I. W. Clarke, A. G. Clarke, F. L. Chaplin, F. Cameron, C. H. Billings, H. S. Baines, E. L. Bach, M. H. Aten, C. W. Appley, E. J. Ellis, J. B. Fast, H. E. Fox, T. Fraser, W. G. Freel, G. W. Garner-Smith, S. N. Giroux, T. H. Heintzman, H. A. Henry, G. W. Hopkins, C. A. James, H. Jamieson, N. A. Jamieson, H. W. Jassby, D. H. P. Johnson, P. M. Keary, J. W. King, G. W. Kitchen, W. F. K. Kretmar, G. W. Lazenby, R. G. Lebeau, A. J. Lowry, A. McDonald, D. St. C. MacDonald, A. W. McHardy, G. E. Meisenheimer, H. Morrow, W. G. G. Murdock, H. E. Peer, A. H. Petch, F. W. Presant, W. R. Reid, E. W. Roesch, N. E. Rostedt, W. H. Saunders, W. E. Searle, T. W. Seymour, W. G. Sibary, E. G. Smith, W. N. Stanley, C. D. Stephenson, L. Thompson, F. M. Tobin, W. V. Tomlinson, G. R. Toms, H. Walden, E. T. Wales, G. V. Wales, L. Werner, C. O. White, M. K. Work, C. L. Arnold, G. B. Emery, G. R. Fleming, P. V. Holder, A. F. Inch, H. C. Wright, April 24th.

The follg. cadets are granted temp. commns. as Sec. Lts. (Obsr. Officers) :—J. Taylor, J. S. Wharrie-Smith, L. E. Tremayne, E. P. Eveleigh, W. H. Webber, A. J. Waters, R. W. Blundell, W. C. Stannard, G. W. Osborne, June 1st.

C. P. Vivian (late Lt., R.A.F.) is granted the hon. rank of Lt., May 4th.

The surname of Sec. Lt. H. Tannebaum is as now described, and not as stated in the " Gazette " of June 4th.

The notification in the "Gazette" of May 28th regarding Sec. Lt. W. B. Clarke, M.C., is cancelled.

The names of Sec. Lt. C. H. Dickins are as now described, and not as in the "Gazette" of May 28th.

The initials of Sec. Lt. T. McC. Scott are as now described, and not as stated in the "Gazette" of May 28th.

Lt. F. G. Detmold relinquishes his commn. on account of ill-health contracted on active service and is granted the hon. rank of Lt., June 15th.

Lt. J. E. Beveridge resigns his commn. and is granted the hon. rank of Lt., June 15th.

Lt. G. F. C. Rawlings is dismissed the Service by sentence of a General Court-Martial, May 20th.

Administrative Branch.—P. W. Alexander (Maj., Res. of Officers) is granted a temp. commn. as Maj., and to be temp. Lt.-Col. whilst empld. as Courts-Martial President, June 3rd.

Capts. (temp. Majs.) retain their temp. rank whilst empld. as Maj. : L. Legg, April 2nd; W. C. Campbell, D.S.O., M.C., April 14th; A. P. Pargiter, May 21st.

H. Vyvyan-Robinson (temp. Capt., Spec. List) is granted a temp. commn. as Capt., May 13th.

To be temp. Capts. whilst empld. as Capts. :—Sec. Lt. W. H. D. Chamberlain, April 1st; Lt. E. E. Colquhoun, May 26th.

H. W. Burleigh is granted a temp. commn. as Sec. Lt., and to be temp. Capt. whilst specially empld., May 8th.

The follg. are granted temp. commns. as Lts. :—A. H Burman (temp. Lt., A.S.C.), May 23rd; C. W. A. Millar (late Capt., Lond. R.), and to be Hon. Capt., May 24th; H. S. Bloodworth (temp. Lt., Lancs. Fus.); A. E. Brooks (Qrmr. and Hon. Capt., Spec. List), and to be Hon. Capt., May 28th; H. W. Bunbury (Capt., Suff. R.), and to be Hon. Capt., May 30th; J. H. Menzies (late Capt., R. Scots.), and to be Hon. Capt., June 1st; K. H. Leake (Lt., L.N. Lanc. R.), June 3rd.

The follg. are granted temp. commns. as Sec. Lts. :—A. A. Pollitt, H. W. Rigden, June 6th; B. Ninnes, J. P. Strydom, June 7th; J. G. Bennett, W. F. Bevis, H. G. Bright, C. F. Bulmer, T. G. Callard, H. E. Crowcroft, S. U. Dent, J. H. Everett, A. E. M. Fortescue, and to be temp. Capt. wl specially empld.; H. Gambier, B. R. Howell, D. C. Man S. F. Marsh, A. Musgrove, E. S. Peters, H. E. Ray, A. H. R J. G. McK. M. Stronach, L. Wardle-Donald, June 10th.

B. St. J. H. Atteridge (late Sec. Lt., R.A.F.) is granted hon. rank of Sec. Lt., May 4th.

The follg. Sec. Lts. relinquish their commns. on acc of ill-health contracted on active service, and are granted the rank of Sec. Lt. :—A. G. C. W. Faulkner, S. D. Gardiner, H Purnell, T. W. C Terry, June 15th.

Sec. Lt. J. Phillips relinquishes his commn. on account of health caused by wounds, and is granted the hon. rank of Lt., June 15th.

The notification in " Gazette," June 4th, regarding the un mentioned officers (R.D.C.) is cancelled :—C. F. Camp C.I.E., C. G. Toswill, B. M. B. H. Gyll-Murray, R. C. Camp R. C. Bacon, W. F. Shakespear, R. S. C. de Chaffey, Ricketts, Henry F. Roberts, W. A. Dewhurst, J. R. M. Twed J. R. Fox, H. H. Bunn, W. J. Hipkin, H. R. M. Dodd.

The notification in " Gazette," May 21st, regarding S. McCully is cancelled.

Technical Branch.—To be temp. Lt.-Cols. whilst empld. Lt.-Cols. :—Capt. (temp. Maj.) S. S. Kennedy, April 28th; E. W. Stedman, May 1st.

To be temp. Majs. whilst empld. as Majs. :—Lt. C. J. Br bank, April 2nd; Capt. F. H. Songhurst, April 7th.

Lts. to be temp. Capts. whilst empld. as Capts. :—H. Hotchin, May 31st; E. D. L. Davies, June 7th.

Temp. Lts. (Obsr. Officers) to be temp. Lts. :—G. R. Tho H. L. Waddington, May 22nd.

Temp. Sec. Lts. (Admin.) to be temp. Sec. Lts. :—R. Burdon-Sanderson, T. Hodgson, May 22nd; R. J. Berry, 25th.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are firmed in their rank as temp. Sec. Lts. :—C. B. Stamp, A Maurer, May 22nd; G. L. Platfoot, R. H. Semmence, May 2 G. Wade, May 30th.

The following are granted temp. commns. as Sec. Lts W. A. T. Hunter (temp. Lt., R. Ir. Rif.), and to be Hon. H. W. Dunk (Sec. Lt., City of Lond. Yeo., T.F.), May 22 T. H. Gill (Lt. Durh.L.I., T.F.), and to be Hon. Lt.; J. Chester-Walsh (temp. Lt., A.S.C.), and to be Hon. Lt.; J. Carroll (temp. Lt., Durh. L.I.), and to be Hon. Lt.; A. White (temp. Lt., R.E.), and to be Hon. Lt.; F. H. Alder (Lt., R.F.A., Spec. Res.); S. A. Bond (Sec. Lt., Middx. R., T. L. C. Bottoms (Sec. Lt. R.F.A., Spec. Res.); R. P. McDou (Sec. Lt., R.F.A, T.F.); A. R. Parker (Sec. Lt., R.G.A., S Res.), May 25th. The notification in " Gazette " May 1 regarding W. T. Barber, is cancelled.

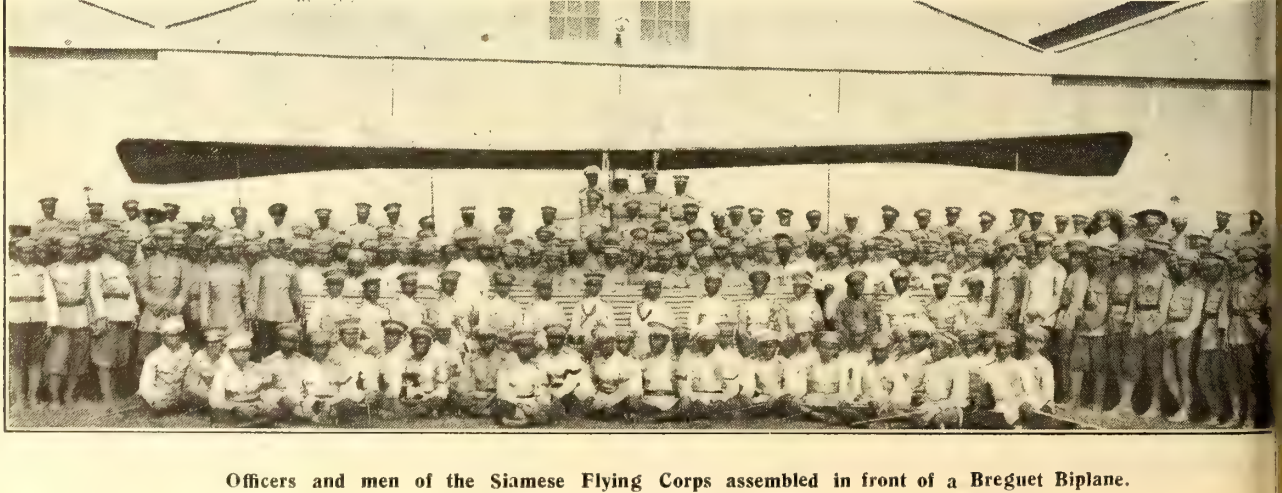
Memoranda.—Sec. Lt. R. A. Caldwell (late Lt., Can. For is granted the hon. rank of Lt., April 1st.

Lt. (Hon. Capt.) G. W. Swanson (Capt., Hamps. R., T relinquishes his commn. on ceasing to be empld., May 19th.

The follg. Officers and other ranks of the Royal Air F have been brought to the notice of the Secretary of State in spect of the valuable services they have rendered in connec with the war, and a record to this effect will accordingly be m in their Official Records :—

Abbott, Lt. (temp. Capt.) D. L.; Allen, Capt. (temp. Lt.-C D. L.

Barber, Capt. (temp. Maj.) C.; Barnfield, Lt. (temp. M A. S.; Bateman, Lt. G. C.; Bingham, Capt. E. I.; Bish Maj. (temp. Lt.-Col.) A. C.; Blairman, Lt. (temp. Capt.) Bond, Capt. (temp. Maj.) E. R.; Boyle, Capt. A. R., M. Brackenboro, Hon. Lt. H. E.; Brockbank, Lt. C. J.; Brool Sec. Lt. E. W.; Bullock, Capt. C. L.; Bulman, Lt. (temp. Ca G. P.; Bunting, Lt. W. J.; Burdett, Hon. Lt. H. S.; B



Officers and men of the Siamese Flying Corps assembled in front of a Breguet Biplane.

. (temp. Maj.) J. W.; Burton, Lt. (temp. Maj.) F. B.; y, Lt. F. E. M.; Butcher, Lt. (temp. Capt.) A. L.; Butter, . (temp. Maj.) C. A. J.
ampbell, Capt. (temp. Maj.) C. D. M., M.B.E. (deceased); el, Capt. temp. Maj.) A. J.; Carden, Lt.-Col. A. D., O.; Carleton, Lt. (temp. Capt.) C. W.; Carthew, Maj. p. Lt.-Col.) T. W. C., D.S.O.; Chapman, Lt. A. W.; Chate, Lt. W. G.; Clark, Capt. A. G.; Clift, Lt. (temp. Capt.) V.; Collier, Maj. (temp. Lt.-Col.) R. H., D.S.O.; Courtney, (temp. Col.) C. L., D.S.O.; Cumming, Lt. (temp. Maj.) Curwen, Capt. (temp. Maj.) J. K.
adley, Lt. H. G., D.C.M.; Davson, Maj (temp. Lt.-Col.) .; de Roemer, Capt. (temp. Maj.) C. W.; Dickson (temp.) J.; Dimmick, Lt. (temp. Capt.) F. C. E.; Donaldson- son, Lt.-Col. R. C., D.S.O.; Dymond, Lt. J.
ckford, Capt. J. W.; Edwards, Lt. (temp. Capt.) T. L.; itt, Maj. S. O.
ord, Capt. (temp. Maj.) H.; Freeman, Maj. (temp. Lt.-Col.) Fuller, Capt. N. R.; Furnival, Lt. (temp. Capt.) J. M.
rdner, Capt. (temp. Maj.) C. E.; Garrard, Capt. R. B.; , Lt. (temp. Capt.) G. A.; Goddard, Capt. (temp. Maj.) .; Goodfellow, Capt. A.; Goulburn, Capt. T.; Griggs, Lt. .
alford, Lt. (temp. Maj.) E. S.; Hall, Lt. G.; Harrison, Lt. .; Healey, Sec. Lt. F. W.; Hedley, Capt. J. F.; Hender- Maj. G. L. P., M.C.; Higginbotham, Maj. W.; Hoare, (temp. Lt.-Col.) F. R. G.; Hodgson, Lt. (temp. Capt.) D.; gson, Lt. (temp. Capt.) W.; Holdsworth, Lt. (temp. Capt.) H.; Holmes, Sec. Lt. A.; Holroyd, Capt. W. H.; Hooper, . (Hon. Maj.) C. A.; Hopkinson, Maj. B., C.M.G.; Hull, . L. S. B.; Hull, Capt, (temp. Maj.) T. G.
mes, Lt. (temp. Capt.) D. C.; Johnstone, Capt. (temp. Maj.) J. C. S.; Jones, Lt. (Hon. Capt.) L. J
aye, Capt. G. W. C.; Kemp, Sec. Lt. S. T.; Kennedy, Capt. H.; Kennedy, Capt. (temp. Maj.) S. S.; Kerridge, Lt. (temp. t.) L. R.; King, Lt. (temp. Capt.) G. J.; King, Lt. (temp. t.) W. J.
rdner, temp. Capt, G. S.; Latimer, Lt. (temp. Lt.-Col.) W. R. G.; Lawrence, Capt. W. A.; Lechmere, Capt. B. H.; Lees, Capt. (temp. Maj.) L. W. W.; Lees-Smith, t. H. S.; Leete, Lt. (Hon. Capt.) W. W.; Leigh-Bennett, t. E. P.; Lywood, Capt. (temp. Maj.) O. G. W. C.
ackenzie, Capt. (temp. Maj.) E. G.; Mann, Hon. Lt. E. L.; sden, Capt. (temp. Maj.) M.; Martiin, Lt. (temp. Capt.) N.; onald, Capt. E. S.; McPhail, Lt. (temp. Capt.) R.; sures, Maj. (temp. Lt.-Col.) A. H.; Methven, Maj. (temp. Col.) M. D.; Meyer, Capt. (temp. Maj.) T. B.; Mitchell, Lt. p. Capt.) R. G.; Moffatt, Capt. A. McR.; Money, Maj. R.; son-Fitzjohn, Lt. (temp. Capt.) G. J.; Moore, Lt. (temp. .) H. J. de C.; Mullard, Capt. S. R.; Munro, Lt. D.; fitt, Capt. (temp. Maj.) C. J.; Murrell, Capt. (temp. Maj.) B. J.
ares, Lt. (temp. Capt.) M. D.; Neal, Lt. A. E.; Newall, Lt. p. Capt.) N. D.; Nicholls, Lt. J. R.
rde, Lt. (temp. Capt.) S. E. H.; Outram, Capt. H. W. S.; en, Lt. (temp. Maj.) P. S. J.
ark, Lt. W.; Passmann, Lt. P. C.; Patteson, Lt. (temp. t.) C., M.C.; Peddell, Lt. (temp. Capt.) T. A.; Peter, Lt. p. Maj.) L. H., M.C.; Pink, Capt. (temp. Lt.-Col.) R. C. M.; nty, Capt. E. P.; Pryce, Capt. (temp. Maj.) W. J. D., D.C.M. Raffles, Capt. (temp. Maj.) S. C.; Rayner, Lt. B. C.; Rayner, Lt. (temp. Capt.) C.; Reid, Capt. (temp. Maj.) G. R. M., M.C.; Rose, Lt. (temp. Capt.) F.; Rose, Lt. W. H.; Ross, Hon. Capt. A. A.; Rudorf, Lt. C. C. G.

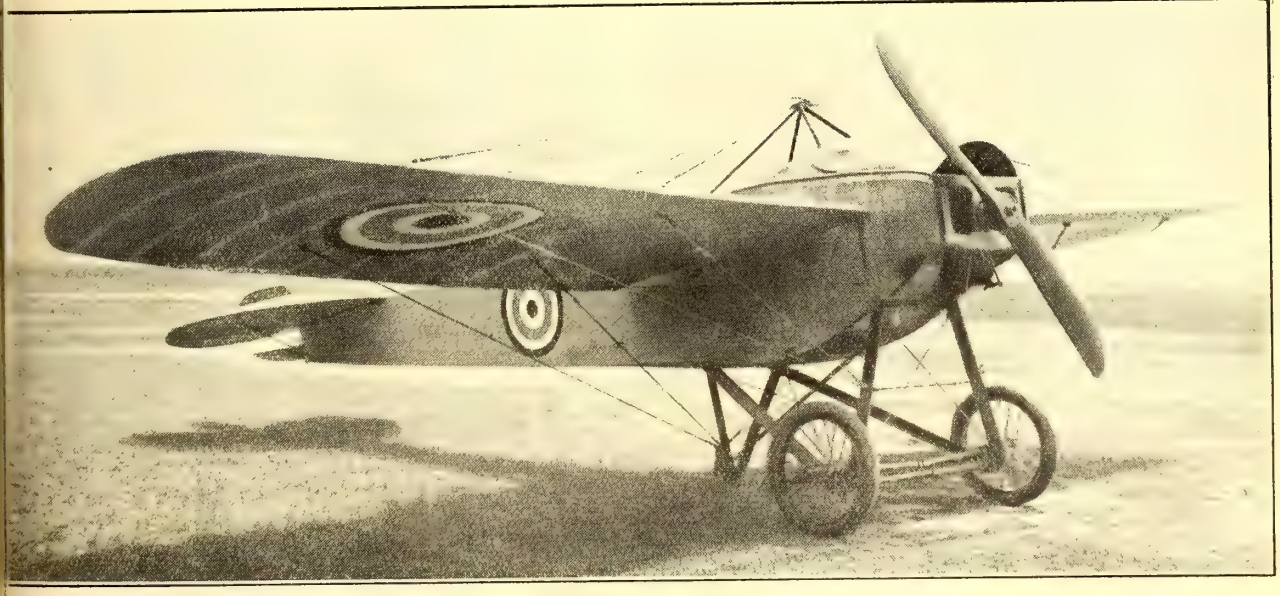
Sandford-Thompson, Capt. W. A. C.; Sargeant, Lt. (temp. Capt.) A. P.; Sanders, Lt. (temp. Capt.) D. B.; Shanks, Sec. Lt. R. J.; Shields, Capt. (temp. Maj.) W. J.; Shirlaw, Lt. (temp. Capt.) W. A.; Smart, Lt. (temp. Capt.) H. G.; Smith, Capt. (temp. Maj.) G. E.; Somerset-Leeke, Capt. A. F. P. H.; Stapleton-Cotton, Capt. (temp. Maj.) R. F.; Stewart, Lt. (temp. Capt.) J.; Stoney, Lt.-Col. (temp. Col.) R. D. S.; Strubell, Capt. (temp. Maj.) T. F. G.; Sweet, Lt. (temp. Capt.) G. H. L.

Tatton, Lt. (temp. Capt.) E. H. (deceased); Thomas, Lt. A. L.; Thomas, Capt. R. W.; Thornely, Lt. (temp. Capt.) J. E. B.; Toyce, Capt. (temp. Maj.) E. G.; Trott, Capt. (temp. Maj.) F. W., M.C.; Tylee, Capt. (temp. Maj.) H. K.

Vagg, Capt. (temp. Maj.) H. R.

Waddington, Capt. C. C.; Walker, Capt. E. G.; Walker, Lt. J.; Ward, Hon. Lt. R. J.; Watts, Lt. W. P. T.; Waylen, Lt. (Hon. Capt.) D. C.; Webb, Lt. (temp. Lt.-Col.) H. L. Wells-Bladen, Capt. L. M.; Whelan, Lt. C. B.; Whittington, Lt.-Col. (temp. Brig.-Gen.) C. H., C.M.G.; Williams, Lt. (temp. Capt.) B. W. M.; Williams, Lt. (temp. Capt.) E. L., M.C.; Wood, Sec. Lt. J. S.; Woolfe, Lt. F. A.; Woolveridge, Lt. H. L.

Aldridge, 5128 Serjt. (Actg. Flt. Serjt.) H.; Armstrong, 6809 Flt. Serjt. T.; Bannister, 48205 Actg. Flt. Clerk J. H.; Barton, 4317 Chief Mech. W. H.; Bartram, 26086 Corpl. J. H.; Bayzand, 29589 Actg. Corpl. C. J.; Blow, 6399 Corpl. J. C.; Brereton, 24244 Serjt. Maj. J.; Brett, 3640 Chief Master Mech. T.; Brown, 25815 Corpl. F.; Brown, 10101 Flt. Serjt. H.; Brutnell, F/23108 Actg. Air Mech. 1 (C) R. M.; Bulmer, F/6019 Ldg. Mech. (W) C. F.; Campbell, 108598 Flt. Serjt. F. (formerly A.O. Corps); Cant, F/16348 Aircraftsman (1st Cl.) W. H.; Chambers, 49399 Serjt.-Maj. J. E.; Coffin, 8806 temp. Serjt.-Maj. H. H.; Cooper, 37686 Flt. Serjt. A. T.; Crumbie, 12522 Flt. Serjt. J. H.; Curtis, 406716 Serjt. F. A.; Deeks, 21063 Flt. Serjt. P. W.; Divers, 4732 Pte. A. J. (H.A.C., attd. R.A.F.); Duffey, 554 Chief Master Mech. J. J.; Dunlop, 1035 Serjt.-Maj. F. (R.E., attd. R.A.F.); Eggett, 1522 Chief Mech. W.; Fairley, F/14497 Petty Officer (Draughtsman) W. G.; Finn, 401163 Actg. Flt. Serjt. G. F.; George, 22760 Serjt. G. R.; Goodgame, 355 Chief Mech. B. E.; Goodhind, 57041 1st Air Mech. F.; Gray, 61593 temp. Serjt. Maj. G.; Grimwood, 69962 Flt. Sergt. T. A. C.; Griffin, 1867 Flt. Serjt. R.; de Groot, 57417 1st Air Mech. J.; Guttery, 579 Serjt.-Maj. T. E.; Hobson, 403 temp. Serjt.-Maj. A. E.; Howes, 1734 temp. Serjt.-Maj. R. A.; Irvine, 43416 1st Air Mech. T. J.; Langford, 26529 temp. Serjt. Maj. A. S.; Laws, 16845 Corpl. W.; Leach, 49831 Corpl. W.; Loveridge, 42293 temp. Serjt.-Maj. A. A.; Orgles, 48176 Actg. Flt. Clerk W.; Payne, 2435 Serjt.-Maj. F. A. (R.E., attd. R.A.F.); Phillips, 3427 Pte. W. J. (H.A.C., attd. R.A.F.); Roberts, F/4476 Ldg. Mech. (Draughtsman) T. D.; Robinson, 67476 Superintending Clerk G. W. (R.A., attd. R.A.F.); Roser, 21236 Flt. Serjt. C. H.; Scragg, 63237 2nd Air Mech. L. G.; Seabrook, 187 Serjt.-Maj. A. R.; Sheppard, 19199 1st Air Mech. J.; Simons, 23107 Serjt. L.; Simpson, 29274 Serjt. P. S.; Slater, 24022 Flt. Clerk T.; Slaughter 13420 Flt. Serjt. R. P.; Stredder, 2684 Flt. Serjt. E. T.; Street, 58569 Serjt.-Maj. C. (R.A., attd. R.A.F.); Tarrant, 93483 Actg. Corpl. W. H.; Thomas, 3805 Flt. Serjt. W. J.; Thomson, 15883 Corpl. M. M.; Trimm, 2535 Chief Master Mech. S. F.; Trehet, 47580 Corpl. Mech. R. E. A.; Turner, 67098 Actg. Corpl. E. L.; Weston, 19783 Flt. Serjt. A. W.; Whistlecroft, F/4972 Ldg.



A Nieuport monoplane belonging to the Siamese Royal Flying Corps.

Mech. (Draughtsman) A. W.; Williams, 61535 Corpl. E.; Woods, 248, Serjt.-Maj. H.; Wray, 41324 Serjt. T.

* * *

The follg. ladies and gentlemen, employed by the Air Ministry, have been brought to the notice of the Secretary of State in respect of the valuable services they have rendered in connection with the war :—

Alban, D. (Mrs.), Blackheath; Allen, D. M. (Miss), Cricklewood; Anseli, C. F., Blandford.

Barclay, L. B., Ayr; Beresford, A. E., Mill Hill, Middlesex; Blair, E. M. (Miss), Earl's Court; Boorer, A. E. (Miss), Knightsbridge; Boxall, H. (Miss), Clapham Park; Brewer, G. F.Ae.S., Teddington; Britten, I. (Miss), Brondesbury, N.W.; Byham, M. G. (Miss), Battersea.

Cant, M. E. (Mrs.), Putney; Cardew, O. E. (Miss), W. Ealing; Caudle, G. E., Wimbledon; Chase, A. E. (Miss), Sydenham; Clarke, A. M. (Miss), Norbury, S.W.; Collins, W. C., M.D., Knightsbridge; Cook, M. K. (Miss), Peckham Rye, S.E.; Copland, C. T. (Miss), London, W.; Cuddihy, W. A., Camberley; Cullen, M. F. (Miss), Gerrard's Cross; Cummings, N., Bromley, Kent.

Dakyns, M. F. (Miss), Wimpole Street, W.; Dale, J. J., Ealing Broadway; Davie, H. J. (Miss), Streatham Hill, S.W.; Davies, A. M. M. (Miss), Eltham, Kent; Davies, N. (Mrs.), Bristol; de Courcy Ireland, M. (Mrs.), London, W.C.; Dudley, C. (Miss), London, W.; Dundas, M. R. (Mrs.), London, W.

Eadie, J. D., Clydebank; Eaton, F. (Miss), Ealing; Edgar, K. F. (Miss), Salisbury; Eyre, J., M.D., London, W.

Fitzwilliam, I. W. (Miss), London, S.W.; Francis, H. (Miss), London, S.W.; Franklin, P., F.R.C.S., London, W.; Fulton, A. R., Monifieth, Forfarshire.

Gething, C. B. (Mrs.), Fleet, Hants; Gledhill, E. M. (Miss), Kingston-on-Thames; Gilchrist, I. (Miss), Erith, Kent; Godfrey, N. (Mrs.), Finchley; Godsal, G. M. (Miss), London, W.; Goodeve, B. M. (Miss), Hanwell; Gosling, J., Howmill, Carlisle; Gosset, N. (Miss), Hyde Park, W.; Grant, E. M. (Miss), Tufnell Park, N.; Guiver, W. F., Rolls-Royce Co.

Hall, M. (Miss), Eastbourne; Hallack, A. J. (Mrs.), London, W.; Harvey, E. (Miss), Greenwich; Hayward, W. E. (Miss), Salisbury; Hedges, E. M. (Mrs.), Finchley; Hedges, E. T. H., Ayr; Hedley, E. (Miss), London, S.E.; Hickman, H. G., Rolls-Royce, Co.; Hingston, E. G. (Mrs.), London, S.W.; Hodges, M. M. (Mrs.), Bowes Park, N.; Hogg, J. (Mrs.), Ealing; Hoyes, J., Blandford.

Jagger, W., M.B., London, W.

Langton, U. M. (Mrs.), London, S.W.; Lawman, D. C. (Miss), Upper Tooting; Ley, D. R. (Miss), Regent's Park, N.W.; Lilley, P. (Mrs.), South Kensington; Lindsay, G. A. (Miss), New Cross, S.E.; Luff, L. (Miss), Clapham; Lyons, K. L. (Miss), Balham.

McEnerney, L. (Miss), Chelsea; McGavin, L. H., F.R.C.S., London, W.; Mackie, M. D. (Miss), Sydenham; MacLatchie, R. L. (Miss), Forest Hill, S.E.; Martin, M. E. (Miss), Guildford; Marriott, M. V. (Miss), Beckenham, Kent; Mason, E. M. (Miss), Balham, S.W.; Matthews, M. E. (Miss), Surbiton; Merry, M. E. (Miss), Wandsworth Common; Mills, M. E. (Miss), Salisbury; Moorcroft, P. T. M. (Miss), Carshalton.

Newman, O. W. (Miss), Chiswick; Norton, R. M. (Richmond).

Palmer, Madge (Miss), Hanwell; Parker, P. B. (Miss), Wilton House, Eaton Square, S.W.; Parkinson, W. E. (Miss), Forest Hill, S.E.; Parsons, S. (Miss), London, W.; Pearce, G. E. (Mrs Forest Gate, E.; Petrides, E. I. (Mrs.), Holland Road, W Pollock, E. G. (Miss), Kensington, W.; Portch, G. L. (Mis Parsons Green.

Rainie, J. A. C. (Miss), Newton Manse, Ayr; Rogers, F. I Thornton Heath; Rouse, H. M. (Mrs.), Hampton Wick; Russ N. M. (Miss), Tufnell Park, N.; Rye, M. (Miss), Chiswick.

Somerset, M. de C. (Miss), London, W.C.; Stagg, P. M. (Mis New Southgate, N.; Starkey, A. P., Harrow; Steinberg, E. (Mrs.), Kensington, S.W.; Stinton, B. M. (Miss), Salisbur Stutfield, D. (Miss), Hampstead.

Taylor, G. (Mrs.), Chelsea; Taylor, W., Rolls Royce C Thomson, M. A. (Miss), London, W.; Thorne, F. (Miss), Lond W.

Upton, A. M. (Mrs.), Myatts Park, S.E.

Vaughan, E. (Miss), New Cross, S.E.

Wall, R. C. B., M.B., London, W.; Waltham, E. (Mrs.), Br tol; Ward, G. N. (Miss), Chelsea; Watts, W. E. (Miss), Leyt stone; Whitaker, E. B. (Mrs.), St. John's Wood, N.W.; Wickha E. L. (Miss), Clapham; Willby, V. (Miss), Wandsworth; W liams, D. W. (Mrs.), West Kensington; Wright, M. M. (Mis Muswell Hill, N.W.

War Office, June 15th.

REGULAR FORCES.—Establishments. — R.F.C. — M Wing.—Equipt. Officer, 3rd Cl.—Lt. (temp. Capt.) E. H. Colm Spec. Res., from a Flt. Comdr., and to relinquish his temp. ra Feb. 1st.

Gen. List.—The follg. from R.F.C. to be temp. Sec. Lts. 3rd Cl. Air Mech. W. R. K. Atkinson, Feb. 23rd; 2nd Cl. Mech. R. H. Blackmore, March 1st; 2nd Cl. Air Mech. F. Brunton, March 8th.

War Office, June 17th.

REGULAR FORCES.—Staff.—3rd Gr.—Lt. K. R. Fenwick, Household Cav., and R.F.C., and to be temp. Ca whilst so empld., vice Lt. I. H. D. Henderson, M.C., Arg. & Suthd. Highrs., March 16th.

* * *

NAVAL PROMOTION.

June 11th.—The following promotion has been made :—

Staff-Surgn.—C. J. O'Connell to rank of Fleet-Surgn., se June 10th.

OFFICIAL COMMUNIQUES.

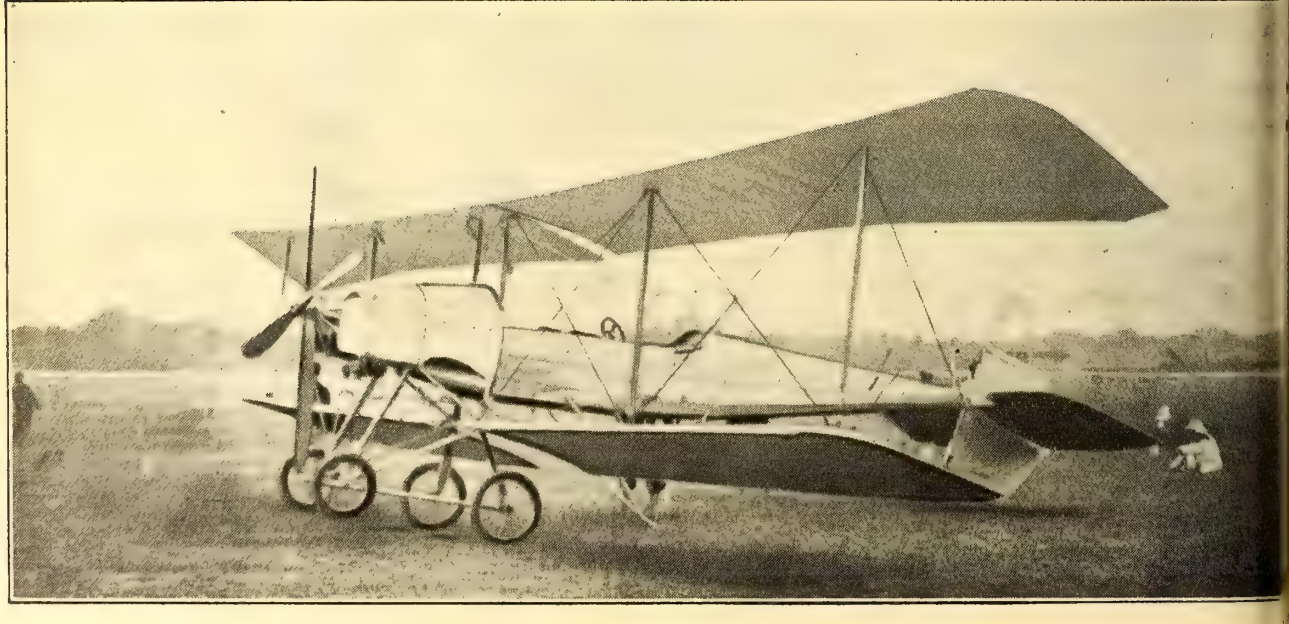
NAVAL.

Admiralty Communiqués.

June 11th.—During the period June 6th to 9th inclusive, bombing raids were carried out on the following objectives : Thourout, Zeebrugge Lock Gates, Brugeoise works, Brug Docks, Bruges Canal, Ghistelles aerodrome (south-east of Osten Marialter aerodrome, St. Denis Westrem aerodrome (sou west of Ghent), Oostacker aerodrome (north-east of Ghent).

In all 14 tons of bombs were dropped and fires were started Bruges Docks, Marialter aerodrome, and St. Denis Westr aerodrome. Four fires and two explosions were caused Eastern Bassin at Bruges Docks. Two direct hits were obser on the Mole, Zeebrugge.

Heavy anti-aircraft fire was experienced and attacks were ma by enemy aircraft which were driven off.



A Breguet Biplane belonging to the Siamese Royal Flying Corps.

REPETITION WORK,

LIGHT PRESSINGS, STAMPINGS & PIERCINGS,

IN ALL METALS.

REYNOLDS BROS., 13-15, Branston St., BIRMINGHAM.



W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

BRUNTONISED NON-RUSTING WIRE-

FOR AIRCRAFT.
BRUNTONS, MUSSELBURGH.

All our machines returned.

Many offensive patrols have been carried out.

In home waters during the same period numerous anti-submarine, hostile aircraft, and escort patrols were carried out by seaplanes, airships, and aeroplanes. Submarines were sighted and bombed, enemy mines located and floating mines sunk.

On occasions while on patrol single British machines have been attacked by enemy formations. In one case a stray bullet shot away a control and the British machine was forced to alight. The crew were subsequently rescued by another British seaplane, which had been sent to search for them.

In another instance our machine—after being disabled—was sunk by hostile machine-gun fire, the crew being rescued by our surface craft.

June 14th.—During the period June 10th to 12th inclusive operations by Air Force contingents have to some extent been attended by unfavourable weather. In addition to the usual patrols, however, bombing operations have been carried out during the day and night against Zeebrugge, Bruges Docks, and Ostend Docks.

On these objectives in all 18 tons of bombs have been dropped. Two hits were observed on the Mole and bursts on seaplane sheds at Zeebrugge; at Bruges fires were caused in Eastern Darse and hits observed in Brugeoise Works; bursts were observed at Bassin de la Marine and Gare Maritime at Ostend; clouds at times prevented observations.

One enemy aircraft was destroyed, and one of our machines is missing.

In home waters, in spite of the handicap of fog, numerous anti-submarine, hostile aircraft, and escort patrols were carried out by seaplanes, airships, and aeroplanes. Submarines have been sighted and bombed and enemy mines located on a number of occasions.

In Mediterranean waters submarines have also been sighted and attacked, enemy mines located, and Allied and neutral shipping convoyed.

During the same period aircraft attached to the British Ægean squadron have bombed aerodromes and enemy works at Drama and other places on the Bulgarian and Turkish coasts. Enemy formations which we met over the Dardanelles were attacked, and two of their fighter scouts were brought down in flames.

MILITARY.

G.H.Q. Communiqués.

June 11th, 7.57 p.m.—On the 10th inst., in spite of cloudy weather, our aviators on the French battle front worked early and late, dropping eight tons of bombs on enemy troops and transport, ammunition dumps, guns, and trenches.

Direct hits were obtained on the railway at Roye-sur-Matz, and on concentrations of infantry in the triangle Montdidier-Ricquebourg-Roye.

Flying low, our machines attacked with machine-gun fire every target that offered itself along the roads behind the fighting line, and an immense number of rounds were fired from the air with good effect.

In this area we shot down six enemy aeroplanes and drove seven down out of control, ourselves losing five machines.

On the British front there was little aerial activity. One German aeroplane was destroyed and one driven down out of control.

We lost two machines.

During the night 10th-11th inst. we dropped seven tons of bombs on Cambrai and Bapaume.

All our night bombers returned safely.

June 12th, 7.40 p.m.—On the 11th inst. British aeroplanes assisted the French counter-attack on the western portion of the Noyon battle front by special patrols sent out to deal with German machines, as well as by vigorous and constant bombing of the enemy's trenches, gun positions, and communications. Heavy machine-gun fire was directed from a low altitude upon hostile troops and transport throughout the same area.

Ten German aeroplanes were destroyed by us during these operations, and four more were driven down out of control.

We lost three machines. Two of our machines reported yesterday as missing have now returned.

Since the German attack began in the Noyon sector on June 9th our squadrons co-operating with the French have dropped 21 tons of bombs and accounted for 29 enemy machines.

On the British front, our aviators and balloons carried on as usual the direction of our artillery fire; some useful aerial reconnaissance and photography were also accomplished.

On this front two hostile machines were shot down and two others driven down out of control.

One of our machines is missing.

The total weight of bombs dropped by us on June 11th, including those dropped beyond the French battle lines, amounted to 14 tons.

On the night of June 11th-12th our night bombing machines heavily attacked the railway at Cambrai and billets at Frémicourt (on the Bapaume-Cambrai road), dropping four tons of bombs without loss.

June 13th, 8.40 p.m.—Our flying squadrons on the French battle front on the 12th inst. were chiefly engaged in offensive patrol work, seeking out German machines and fighting them wher they were found. They destroyed 15 enemy aeroplanes, som which went down in flames, while others broke in the air.

One of our machines in this sector is missing.

On the British front a good deal of aerial reconnaiss photography, and artillery observation was carried out.

We lost two machines, and destroyed five German mach Two other hostile machines were driven down out of control, a German observation balloon was brought down in flam

Twenty-two tons of bombs were dropped by us during the the principal targets attacked being Don junction, the rail at Courtrai, Armentières, and Chaulnes, the dump at Bapa and Bruges docks.

The weather at night was unsuitable for flying.

On the afternoon of the 12th inst. two successful raids carried out by our squadrons against the Metz-Sablon rai station and sidings. Many heavy bombs were dropped.

On the 13th inst. one squadron of our aeroplanes attacke station at Trèves, another dropped a ton of bombs on the fact and stations at Dillengen (north by west of Saarbrücken). the same time the factories and station at Hagendingen (nor Metz) were subjected to attack. At Dillengen direct hits observed on two furnaces. Successful long-distance photogr reconnaissances were carried out by our machines.

In the course of attacks made by the enemy on our bom machines one hostile aeroplane was destroyed and two o were driven down.

One of our machines is missing.

June 14th, 7.40 p.m.—On June 13th low clouds and poor bility impeded work in the air, but our machines took advar of spells of clearer weather to observe for artillery fire, a carry out numerous patrols and reconnaissances.

Nine tons of bombs were dropped by us on Zeebrugge Armentières, and Comines stations, and on targets in the F battle area.

Ten hostile aeroplanes were destroyed during the day, and driven down out of control. A German balloon was brought in flames.

We lost five machines.

Heavy mists prevented flying at night.

June 15th, 10 p.m.—Flying on the 14th inst. was much li by low clouds and high wind.

Two enemy aeroplanes were driven down out of control.

We lost two machines.

June 16th, 8.35 p.m.—On the 15th inst. our aviators carrie reconnaissance work and co-operation with the artillery as and took a number of photographs.

Ten tons of bombs were dropped by us during the day, and tons by night, the most important targets being the railway tions of Estaires and Armentières and Bruges docks.

In air fighting we brought down three German machine one observation balloon, and drove down two other hostile planes out of control.

None of our machines is missing.

June 17th, 8.45 p.m.—Uncertain weather interfered with operations on the 16th inst., but a good deal of observatio artillery fire was carried out by our aeroplanes and ball Numerous photographs were taken, and many useful reco sances were accomplished by our machines.

Enemy aircraft were active at times on the northern p of the British front and in the French battle zone.

Eleven hostile machines were destroyed by us in air fig and nine driven down out of control. One German balloo brought down in flames. In addition, one hostile machine wa down and another driven down out of control by our anti-ai fire. We lost 10 machines during the day, six of which working south of Montdidier.

We dropped 22 tons of bombs by day and 12 tons durin following night, heavily attacking the railways at Arment Estaires, Comines, and Courtrai, and the docks at Bruges.

Two of our night-flying machines failed to return.

War Office Communiqués.

June 12th.—The G.O.C. Italy reports:—

Since my last report the Royal Air Force have destroy enemy aeroplanes.

Four of our machines have failed to return.

June 15th.—The G.O.C. Macedonia reports:—

On June 12th four hostile aeroplanes were brought down Miletkovo (in the Vardar Valley, 13 miles behind the en line) during a combat with our scouts. Three were observ crash in flames. All our machines returned safely.

June 16th.—The G.O.C. Palestine reports:—

On June 11th Amman railway station (on the Hedjaz Rai 25 miles east of the Jordan), together with the enemy's aeroc and hostile troops and transport in its vicinity, were h bombed by our aeroplanes.

June 15th.—The G.O.C. Italy reports:—

For several days no flying has been possible owing to we conditions, and to-day was also unsuitable for flying except i very early morning. During this period seven hostile ma were destroyed and two balloons brought down in flames.

During the afternoon our flying squadrons have been contir engaged in machine-gunning and bombing enemy bridges

n small and large stone bottles, and in , ½ and gallon trums.



FIRST IN 1880 FOREMOST EVER SINCE.

The quickest drying and hardest Enamel manufactured.

ROMPT ELIVERY GAINST A ERTIFI-CATE.'

EASE SPECIFY CLUB" BRAND TO ENSURE GETTING OUR GOODS.
Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufacturers:

SILICO ENAMEL CO.,
NEW CROSS, LONDON, S.E.

THE TIELOCKEN

Burberry Weatherproof



As a distinguished and efficient, light-weight and healthful safeguard for R.A.F. Officers THE TIELOCKEN is perfection.

Its ease of adjustment and double protection over vital areas are features of special value.

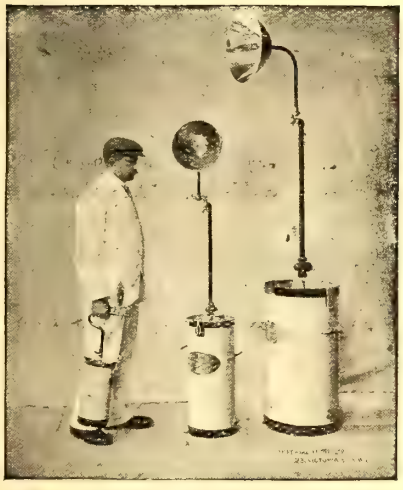
Burberry materials are proofed without rubber, oiled-silk or other air-tight agents, being faultlessly self-ventilating and hygenic in all temperatures.

Complete R.A.F. Kits in 2 to 4 Days; or Ready for Use.

Service Weatherproofs.
During the War BURBERRYS Clean and Re-proof Officers' Service "Burberrys," Tielockens, and Burberry Air-Warms
FREE OF CHARGE.

Illustrated Military or Naval Catalogue sent post free on request.

BURBERRYS Haymarket S.W. 1. LONDON
8 & 10 Bd Malesherbes PARIS; also Provincial Agents



Large numbers of these three types have been supplied.

IMPERIAL LIGHTS
— FOR —
AERODROME LIGHTING

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON, S.W.1.

Telegrams— "EDIBRAC, PHONE, LONDON.'

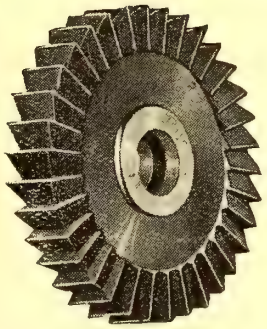
Telephone— VICTORIA 3540 (3 Lines)

TWIST DRILLS



QUICK DELIVERIES.

MILLING CUTTERS



CENTRE DRILLS.

SEND US



YOUR ENQUIRIES.

Vices, Taps, Dies, Files, etc., etc.

LEACH STUART & CO.,
32, Queen Victoria St., London, E.C.4.
'Phone: 7380 CITY. 'Grams: "EACTUARTOL," LONDON.

transport on the Lower Piave, doing great damage from low altitudes.

June 16th.—The G.O.C. Italy reports :—

Three further enemy aeroplanes were destroyed in air fighting yesterday, in addition to the seven previously reported. The clouds remain low, and distant reconnaissance is impossible. The energy of our Air Service has been mainly confined to attacks on the bridges and troops which the enemy are attempting to throw across the Piave. In these attempts (? attacks) they have been very successful.

June 17th.—The G.O.C. Italy reports :—

On the 15th and 16th the R.A.F. dropped over 300 bombs and fired over 25,000 rounds of machine-gun ammunition at troops and transport attempting to cross the Piave.

Home Command Communiqué.

June 17th, 3.15 p.m.—A hostile aeroplane crossed the Kent coast shortly after mid-day to-day. It was fired at by the anti-aircraft defences, and made out to sea immediately.

AIR FORCE.

June 17th.—The following bombing operations into Germany were carried out by the Independent Force, R.A.F., from June 6th to June 11th both dates inclusive :—

The railway station and sidings of Thionville were attacked no fewer than four times; several direct hits were observed on the station, and an explosion was seen to take place near the Carlshütte Works.

At Metz-Sablon, which was twice attacked, a train received a direct hit and was wrecked.

In all, some six tons of bombs were dropped on these objectives, and a large number of rounds was fired from machine-guns at low altitudes.

Attacks were also delivered against the railway sidings at Karthaus (south of Trèves) and railways and munition factories at Hagendingen (north of Metz) and Dillingen (north by west of Saarbrücken), some 3½ tons of bombs being dropped with good results.

From all the expeditions all our machines returned in safety.

THE CASUALTY LIST.

MILITARY.

Reported June 12th.

Previously reported Missing, now reported Prisoners in German Hands.—Hollis, Lt. A., Hamps R., attd. R.F.C.

Australian Force.—Previously reported Missing, now reported Killed.—Courtney, Lt. J. C., Aust. F.C.

Reported June 13th.

Canadian Force.—Accidentally Killed.—Choate, Lt. F. H., Alta. Regt., attd. R.A.F.

Wounded.—Ryding, Lt. A. S. H., Cent. Ont. Regt., attd. R.A.F.

Missing.—Zieman, Lt. J. R., E. Ont. Regt., attd. R.A.F.

Reported June 15th.

Previously reported Missing, now reported Prisoner in German Hands.—Sharpe, Capt. T. S., Glouc. Regt., attd. R.F.C.

Reported June 18th.

Accidentally Killed.—Butler, Sec. Lt. H. R. H., F.C.

* * *

Casualties Among N.C.Os. and Men.

The Dates are those of the Official List.

Previously missing, now reported by the German Government Killed or Died of Wounds.

June 5th.—R.F.C.—Stead, 2119, Serjt. G. (Moss Side).

Previously reported Missing, now reported Died as Prisoner of War in German Hands.

June 5th.—R.F.C.—Clarke, 99044, 1st Cl. Air Mech. J. S. (Moseley).

Australian Imperial Force.

Wounded.

June 3rd.—Aust. F.C.—Aitken 3676 H.

June 4th.—Backhouse, 1550, G.

AIR FORCE.

Reported June 12th

Killed.—Ayles, Lt. F. P. Gren. Gds. and R.A.F.
Banks, Sec. Lt. F., Essex R. and R.A.F.
Crysler, Sec. Lt. C. A., R.A.F.
Dyson, Sec. Lt. S. G., R.A.F.
Filgate, Sec. Lt. D. M., R.A.F.
Jowett, Sec. Lt. T., R.A.F.
Le Mesurier, Capt. T. F., R.A.F.
Mears, Lt. H. F., R.A.F.
Medcalf, Capt. J. H., R.A.F.
Millar, Capt. J. H., R.A.F.
Norman, Sec. Lt. H., R.A.F.
O'Hara, Sec. Lt. H. E., R.A.F.
Pawson, Sec. Lt. W. S., R.A.F.
Roach, Sec. Lt. D. J., R.A.F.
Scarborough, Sec. Lt. E. O., King's (L'pool R.) and R.A.F.

Wounded.—Hall, Sec. Lt. J. F. A., E. Yorks. R., attd. R.A.F.; Hamilton, Lt. P. D. P., R.A.F.; Jacklin, Sec. Lt. W., R.A.F.; Jarrom, Sec. Lt. R. F., R.A.F.; Maund, Capt. H. B., R.A.F.; Phillips, Sec. Lt. F. N., R. Dub. Fus., attd. R.A.F.; Sheard, Sec. Lt. F. V., R.A.F.; Wild, Sec. Lt. W. R.A.F.

Missing.—Aspinall, Capt. J. V., R.A.F.; Brewster, Sec. L. J. L., R.A.F.; Collins, Sec. Lt. F. F., R.A.F.; Drew-Broo Sec. Lt. T. G., R.A.F.; Dunford, Sec. Lt. B. F., R.A.F Hudson, Sec. Lt. F. J. D., R.A.F.; Patenaude, Sec. Lt. R.A.F.; Reece, Sec. Lt. S. B., R.A.F.; Scobie, Lt. C. R.A.F.; Taylerson, Lt. N. A., R.A.F.; Townsend, Sec. L H. E., R.A.F.

Previously reported Missing, now reported Killed.—Balfou Lt. B., Lond. R. (T.F.) and R.A.F.; Gillespie, Sec. D. V., R.A.F.

Reported June 13th.

Killed.—Alloway, Sec. Lt. C. W., R.A.F.
Anketel, Sec. Lt. C. E., R.A.F.
Backler, Sec. Lt. A. M., Lond. R. and R.A.F.
Balch, Sec. Lt. R. P., R.A.F.
Bevington, Sec. Lt. C. C., R.A.F.
Biddle, Sec. Lt. F. H. H., R.A.F.
Clitheroe, Sec. Lt. J. N., R.A.F.
Daly, Lt. J. J., R.A.F.
D'Etchegoyen, Sec. Lt. B. A. P. L. D., R.A.F.
Farmer, Sec. Lt. A. O., R.A.F.
Ffrench, Sec. Lt. G. E., R.A.F.
Glanville, Capt. H. E., West India R. and R.A.F.
Headlam, Sec. Lt. J., R.A.F.
Houghton, Sec. Lt. F. M. C., R.A.F.
Jones, Sec. Lt. J. J., R.A.F.
Johnson, Sec. Lt. C. E., R.A.F.
Kelsey, Sec. Lt. W. J., R.A.F.
Lashford, Sec. Lt. V. C., R.A.F.
Lardner, Sec. Lt. R., R.A.F.
Laughton, Lt. H. P. W., R.A.F.
Makepiece, Lt. R. M., R.A.F.
McClure, Sec. Lt. T. A., Con. Rangers and R.A.F.
McMaster, Capt. F. H., R.A.F.
Machin, Sec. Lt. J. E., R.A.F.
MacTavish, Sec. Lt. I. A. B., R.A.F.
Nash, Sec. Lt. G., R.A.F.
Nelson, Lt. K. A., R.A.F.
Parker, Lt. A. F., W. Yorks R. and R.A.F.
Partridge, Sec. Lt. H. E., R.A.F.
Reid, Sec. Lt. J. M. M., R.A.F.

Wounded.—Arnison, Lt. C. H., R.A.F.; Barlow, Sec. W. H., R.A.F.; Chattaway, Sec. Lt. H. W., R.A.F.; Davis Sec. Lt. H. F., R.A.F.; Flowers, Lt. H. F., R.A.F.; Gibs Lt. C. J. R., Camn. Highrs. (T.F.), attd. R.A.F.; Hasl Sec. Lt. T. M., R.F.A., attd. R.A.F.; Hill, Sec. Lt. L. R.A.F.; Hooton, Sec. Lt. L. C., R.A.F.; Hughes, Sec. A. B., R.A.F.; Lane, Sec. Lt. R. A., R.G.A., attd. R.A.F Russell, Capt. C. N., R.A.F.; Sharp, Sec. Lt. G. F., R.A.F Short, Lt. L. T., K.O.Y.L.I., attd. R.A.F.; Turnbull, S Lt. S. S., R.A.F.; Thomas, Sec. Lt. W. L., R.A.F.; Tullo Sec. Lt. J., R.A.F.

Missing.—Aird, Sec. Lt. A. W., R.A.F.; Anderson, Sec. D. S., R.A.F.; Atkinson, Sec. Lt. F., R.A.F.; Bell, Ca D. J. (M.C.), R.A.F.; Blaxhill, Sec. Lt. F. H., R.A.F Bray, Sec. Lt. C. L., R.A.F.; Brotheridge, Sec. Lt. F. R.A.F.; Brown, Sec. Lt. V. R., R.A.F.; Bruce, Sec. Lt. P. King's L'pool R. (T.F.), attd. R.A.F.; Craib, Sec. Lt. W. R.A.F.; Crawford, Sec. Lt. W. L., K.R.R.C. and R.A.F Clarke, Sec. Lt. H. A., R.A.F.; Claye, Capt. H., Sher. Fo attd. R.A.F.; Davidson, Sec. Lt. S., R.A.F.; Harr Sec. Lt. N. B., R.A.F.; Herring, Sec. Lt. A. R.A.F.; Howell-Jones, Sec. Lt. A. C., R.A.F.; Hunt Sec. Lt. H. C., R.A.F.; Lasker, Sec. Lt. R. S., R.A.F Le-Roy, Lt. H. L., R.A.F.; Macklin, Sec. Lt. C. R.A.F.; Milani, Sec. Lt. R. S., R.A.F.; Millar, S Lt. K. O., R.A.F.; Mitchell, Sec. Lt. H., R.A.F.; Palfr man, Capt. A. E., R.A.F.; Peat, Sec. Lt R. W., R.A.F Rainler, Sec. Lt. G. A., R.A.F.; Reddie, Sec. Lt. F. R.A.F.; Roe, Lt. H. A, H., R.A.F.; Salter, Lt. G. C. (M.C), E. Yorks R., attd. R.A.F.; Southall, Sec. Lt. W. R.A.F.; Stockenstrom, Sec. Lt. A. L., R.A.F.; Tansley, S Lt. H. E., K.R.R.C. and R.A.F.; Watson, Sec. Lt. G., R.A.F Whitehead, Capt. L. E., R.A.F.

Reported June 12th

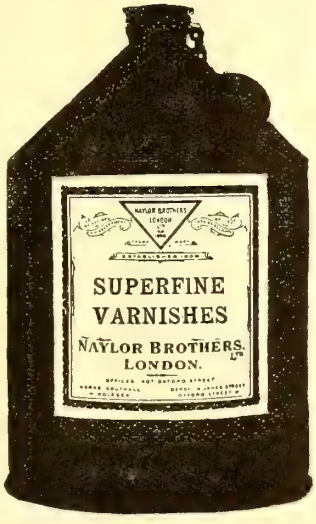
Killed.—Barber, Lt. V. L., R.A.F.
Benbow, Capt. E. L., R.F.A. and R.A.F.
Bourner, Sec. Lt. R. R., R.A.F.
Fullerton, Sec. Lt. C. A. C., R.A.F.
Garnons-Williams, Capt. A. C., S. Wales Bord. and R.A.F
Little, Capt. R. A. (D.S.O., D.S.C.), R.A.F.
Miller, Sec. Lt. B. (M.C.), R.G.A. and R.A.F.
Moyneham, Sec. Lt. P. C., R.A.F
Peacock, Sec. Lt. E., R.A.F.
Rowell, Sec. Lt. T. (M.C.), R. Berks R., and R.A.F.
Scott, Lt. C. K., R.A.F.
Shield, Sec. Lt. F. L., R.A.F.
Tart, Sec. Lt. E. G., R.A.F.
Vandenberg, Sec. Lt. F. A., R.A.F.
Waller, Sec. Lt. R. P., R.A.F

THE USE OF

NAYLOR'S Aero Varnishes

VILL ENSURE A ERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



ome Specialities or Aero Work.

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

ree Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.

Contractors to all Government Departments.

ffices: 407/9, OXFORD ST., LONDON, W. Also at SOUTHALL.

Glue-pots

ELECTRICALLY HEATED.

Others are largely using these

—including the leading Aeroplane Factories, Munition Works, Woodworking Firms, Pattern Shops, Dockyards, Railways, Engineers, &c.

We undertake to promptly equip your works completely with every requirement in

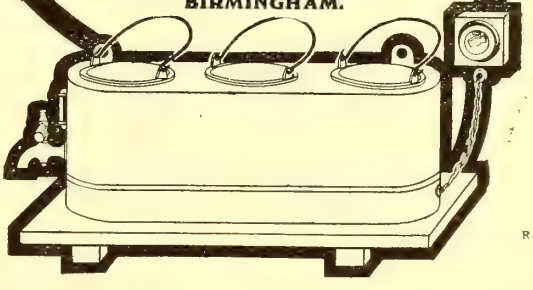
SINGLE, DOUBLE or TRIPLE

Electrically heated Glue-pots. Cast-iron Vessels Solid Copper Water Bath with Water Level Gauge.

The Regulating Switch permits the heat being applied and maintained at High, Medium or Low Temperatures as required. Made in all sizes.

Ask us to quote you for your needs.

PREMIER ELECTRIC HEATERS, Ltd., 258-260, BRADFORD STREET, BIRMINGHAM.



R.H.S.

PROPELLERS ONLY.

W. DODDY & Co.
LEEDS.

CONTRACTORS TO H.M. GOVERNMENT

Office—
Balm Road, Hunslet, Leeds.

Telephone—
24,214.

Telegrams—
Airscrews, Leeds.

ROK ROOFING

facilitates the speedy erection of Hangars by combination with our famous "Belfast" Girder Principals in

ANY CLEAR SPAN UP TO 100 FEET.

BRITISH & BEST

Write for Booklet "R."

48



D. ANDERSON & SON, Ltd., Lagan Felt Works, Belfast; and Roach Road Works, Old Ford, London, E.

Wounded.—Barnes, Sec. Lt. W. E., Sher. For., attd. R.A.F.; Benton, Sec. Lt. J. W., R.A.F.; Chippindale, Lt. H. A., R.A.F.; Clinton, Sec. Lt. A. C., R.A.F.; Fitness, Sec. Lt. A. E., R.A.F.; Hepburn, Sec. Lt. R. V., R.A.F.; Instone, Sec. Lt. B., R.A.F.; Kent, Sec. Lt. E. A. W., R.A.F.; Morgan, Capt. W. A. C. (M.C.), Welsh R. and R.A.F.; Melville, Lt. H. T., Sea. Highrs., attd. R.A.F.; Pate, Sec. Lt. A. D., R.A.F.; Sexton, Lt. M. C., King's L'pool R., attd. R.A.F.; Short, Lt. L. H. (M.C.), Durh. L.I. (T.F.), and R.A.F.; Whittaker, Sec. Lt. H. A., R.A.F.

Missing.—Anderson, Sec. Lt. J. L. K., R.A.F.; Beaumont, Sec. Lt. C. C. A., R.A.F.; Cairnes, Capt. W. J., Lens. R. and R.A.F.; Dennett, Lt. P. M., R.A.F.; Devitt, Sec. Lt. A., R.A.F.; Godet, Sec. Lt. L. de G., R.A.F.; Haley, Sec. Lt., A., Essex R., attd. R.A.F.; Henderson, Capt. K. S., R.A.F.; Sieveking, Capt. V. E. (D.S.O.), R.A.F.; Tannenbaum, Sec. Lt. H., R.A.F.; Taylor, Sec. Lt. W. E., R.A.F.; Whitehouse, Sec. Lt. F., R.A.F.

Reported June 15th.

Killed.—Barton, Sec. Lt. L. F., R.A.F.
Brittain, Sec. Lt. R. A. H., R.A.F.
Chapman, Lt. S., R.A.F.
Joyce, Sec. Lt. C. G., R.A.F.
Loder-Symonds, Capt. W. C., Wilts R. and R.A.F.
Love, Sec. Lt. F. B., R.A.F.
Molyneaux, Sec. Lt. G., R.A.F.
Peirce, Lt. G. F., R.A.F.
Robinson, Sec. Lt. G. C., K.O.Y.L.I. and R.A.F.
Slavik, Sec. Lt. J., R.A.F.
Smith, Lt. C. G., R.A.F.
Stuart, Capt. P. D., R.A.F.
Wiggins, Sec. Lt. H. C., R.A.F.
Wood, Lt. P. B. S., R.A.F.

Died of Wounds.—Hutcheson, Sec. Lt. G. J., R.A.F.

Wounded.—Baird, Sec. Lt. A., R.A.F.; Darlington, Sec. Lt. O., R.A.F.; Hay, Sec. Lt. J. H., R.A.F.; Hinchcliffe, Capt. W. G., R.A.F.; Hunter, Lt. W. A., R.A.F.; Lambert, Sec. Lt. G. W., R.A.F.; Mackenzie, Sec. Lt. J. J., R.A.F.; Pickering, Lt. P., R.F.A., T.F., attd. R.A.F.; Priestley, Sec. Lt. G. R., R.A.F.

Missing.—Bennett, Lt. R. G., R.A.F.; Webster, Sec. Lt. A. N., R.A.F.; Hennessey, Sec. Lt. H. S., R.A.F.

Reported June 17th.

Killed.—Burnett, Lt. S., Bedf. R. and R.A.F.
Dunlop, Sec. Lt. H. S. A., R.A.F.
Hyde-Thompson, Lt.-Col. D. H., R.A.F.
Lucas, Lt. T. H., Hamps. R. and R.A.F.
Lochead, Sec. Lt. R. W., R.A.F.
Preston, Sec. Lt. H. D., R.A.F.
Smith, Lt. F. B., R.A.F.
Stevens, Sec. Lt. R. H. B., R.A.F.
Taylor, Sec. Lt. F. C., R.A.F.

Died of Wounds.—Morgan, Lt. E. P., R.A.F.

Wounded.—Anderson, Sec. Lt. E. W., R.A.F.; Blackman, Lt. H., D.L.I. and R.A.F.; Bland, Lt. D. C. S., R.A.F.; Gane, Lt. S. E., R.A.F.; Hadfield, Sec. Lt. W. H., R.A.F.; Harvey, Lt. L. G., R.A.F.; Inman, Sub-Lt. S. P., R.A.F., Jones, Lt. S. N., R.A.F.; Lawson, Lt. E. R., R.A.F.; Lence, Lt. F. M., R.A.F.; Plaxton, Sec. Lt. F. W., R.A.F.; Summers, Sec. Lt. M. de V., R.A.F.; Tong, Sec. Lt. A F., R.A.F.; Warren, Sec. Lt. W. T., R.A.F.; Wedekind, P/F.O. C. A., R.A.F.; Young, Sec. Lt. R. G., R.A.F.

Missing, believed Killed.—Magor, Capt. N. A. (D.S.C.), R.A.F

Reported June 18th.

Killed.—Butt, Lt. F. W., R.A.F.
Lutyens, Lt. L. F. D., R.A.F.
Moreton, Sec. Lt. N. H., R.A.F.
Murray, Lt. W. S., R.A.F.
Thomson, Capt. G. E., D.S.O., M.C., R.A.F.
Townsend, Sec. Lt. R., R.A.F.
Van Ryneveld, Sec. Lt. J. P., R.A.F.
Williams, Sec. Lt. G. F., R.A.F.
Wyman, Sec. Lt. A. T., R.A.F.

Died of Wounds.—Smith-Grant, Capt. J. G. S. C., R Scots and R.A.F.

Wounded.—Babington, Maj. P. (M.C.), Hants R. and R.A.F.; Darbyshire, Sec. Lt. C., R.A.F.; Dickson-Phurley, Lt. P. W., R.A.F.; Eyres, Lt. J. H., R.A.F.; Guest, Sec. Lt. J. H., R.A.F.; Harman, Sec. Lt. A., R.A.F.; Holden, Sec. J. E. R.A.F.; Horwood, Lt. R. H., R.A.F.; Knight, Sec. Lt. C., Berks. R., attd. R.A.F.; Malling, Lt. R. B., R.F.A. and R.A.F.; Masters, Sec. Lt. A. G., R.A.F.; Miller, Lt. J. M. R., K.O.S.B. and R.A.F.; Milton, Sec. Lt. J., R.A.F.; Morrison, Sec. Lt. J. L., R.A.F.; Noble, Sec. Lt. J. R., R.A.F.; Ralli, Lt. E. J., R.A.F.; Scott, Sec. Lt. D. P., R.A.F.; Smith, Sec. Lt. C. O., R.A.F.; Townsend, Lt. S., R.A.F.; Warburton, Sec. Lt. H., R.A.F.

Missing.—Dawe, Sec. Lt. J. J., R.A.F.; Dunster, Sec. Lt. C. H., R.A.F.; Reid, Lt. J., R.A.F.

Reported June 19th.

Killed.—Bolay, Sec. Lt. A. R., R.A.F.
Coffey, Lt. C. R., R.A.F.
Davidson, Sec. Lt. W. D., R.A.F.
Flavelle, Sec. Lt. V. A., R.A.F.
Mitchell, Lt. N. R., R. Scots and R.A.F.
Nugent, Sec. Lt. A., R.A.F.
Willey, Sec. Lt. R., R.A.F.

Wounded.—Birkinshaw, Sec. Lt. J. J., R.A.F.; Brown, Lt C. W., Middx. R. and R.A.F.; Crocker, Sec. Lt C. K. R.A.F.; Crozier, Lt. A., R.A.F.; Finke, Sec. Lt. R., R.A.F. Foxall Smedley, Sec. Lt. F. E. J., R.A.F.; George, Lt. W. A. R.A.F.; Hurridge, Lt. L. H., Royal Fus. and R.A.F.; Layton Sec. Lt. W. D., R.A.F.; MacLean, Capt. G. J., R.A.F. Malcolm, Sec. Lt. W. A., R.A.F.; Mair, Capt. W. J., R.A.F. Mawson, Lt. L., R.A.F.; McKellar, Sec. Lt. D., R.A.F. Reeler, Sec. Lt. W. L., R.A.F.; Slater, Sec. Lt. I., R.A.F. Scroggs, Sec. Lt. A. F., R.G.A., attd. R.A.F.; Williams Sec. Lt. A. T., R.A.F.

Missing.—Gregory, Sec. Lt. R. J., R.A.F.; Magee, Sec. Lt E. A., R.A.F.; Turner, Capt. H., R.A.F.; Webb, Sec. Lt G., S. Staffs. R., attd. R.A.F.

* * *

Casualties Among N.C.Os. and Men.

Reported June 15th.

Killed.—Luff, 43738 Serjt. P. (Lee-on-Solent); Shields, 12653 2/Pte. W. (Salford).

Died.—Lingard 4352 Serjt. V. (Darwen).

Wounded.—Anthony, 39542 1st Air Mech. J. (Sandown, S.W.) Camps, 131074 3rd Cl. Air Mech. A. A. (Kentish Town N.W.); Jenkins, 58782 2nd Cl. Air Mech. F. (Redland Bristol); Moore, 9856 1st Cl. Air Mech. H. W. (Devonport); Ruddy, 11910 1st Cl. Air Mech. W. G. (Kentish Town, London, N.W.); Yunk, 8900 1st Cl. Air Mech. O. (Hillgate, London, W.).

Missing.—Smith, 14455 Temp. Serjt.-Maj. D. G. (Croydon).

Reported June 17th.

Killed.—McLaughlan, 21067 Cpl. F. (Leeds).

Died of Wounds.—Colinsky 44349 2nd Cl. Air Mech. J. (Whitechapel, E.); Levy, 98128 2nd Cl. Air Mech. A. (Glasgow).

Previously reported Missing, now reported Missing, believed Killed.—Taylor, F/21701 Pte/1 C. V. (Rochford Essex).

Wounded.—Gidley, 43585 2nd Cl. Air Mech. S. C. (Worcester Park, Surrey).

Previously reported Missing, now reported Missing, believed Wounded and Prisoner of War.—Archer, 525 Cpl. F. (Burton-on-Trent).

* * *

The following British officer prisoners of war arrived in Holland for internment on June 14th:—

Clements-Finnerty, Lt. H., 17th Lrs., attd. R.A.F.; Farmer Lt. E. R., Notts Yeo., attd. R.A.F.; Graham, Lt. L. N., W Yorks R., attd. R.A.F.; Long, Lt. H. O., R.E. and R.A.F. McEwen, Capt. J. H. F., Cam'n Highrs., attd. R.A.F.; Nicho Lt. R. W., R.A.F.

PERSONAL NOTICES.

NAVAL.

Deaths.

LUPTON.—Capt. Charles Roger Lupton, D.S.C., R.A.F., wa the only son of Mr. and Mrs. Charles Lupton, of Carr Hea Roundhay, Leeds. He was educated at Hillbrow and at Mr. G. F Bradby's House at Rugby. He left school in July, 1916, before h was 18, to join the R.N.A.S., and after obtaining his full certifi cate he served at home stations, and at one place he met with serious accident in April, 1917, which incapacitated him for tw months. He was sent to Flanders in August, 1917, to take u work with a bombing squadron, and while there received th D.S.C. Capt. Lupton was made an acting Flt. Comdr. in Jan 1918, and when he was transferred to the R.A.F. he was promote Capt. In March, 1918, his squadron was moved, and shortly after wards he received a Bar to the D.S.C. He was killed in actio on May 9th, 1918.

WOOD.—Lt. Patrick Bryan Sandford Wood, R.A.F., was th elder son of Dr. Charles Wood, of Caius College, Cambridge and Mrs. Wood. He was born in 1899, and was killed in a aeroplane accident on active service on May 24th. He wa educated at the King's College Choir School, Cambridge, an afterwards at Rossall School, where he was a member of th O.T.C. He joined the Royal Naval Air Service in September 1917, and left England on March 24th last to go to his activ service station abroad. Mr. Wood was a keen cricketer, be coming a member of the Rossall School team.

Engagement.

HOARE—TROUNCE.—An engagement is announced betwee Capt. John Edward Alfred Hoare, D.S.C., R.A.F., only son o Mr. and Mrs. Alfred Hoare, of Charlwood, East Grinstead, an Marjorie Gwendoline, fourth daughter of Mr. and Mrs. S. F Trounce, of Culroy, Truro, Cornwall.

J.B. Brooks & Co. Ltd.

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.
Great Charles Street, Birmingham.
16

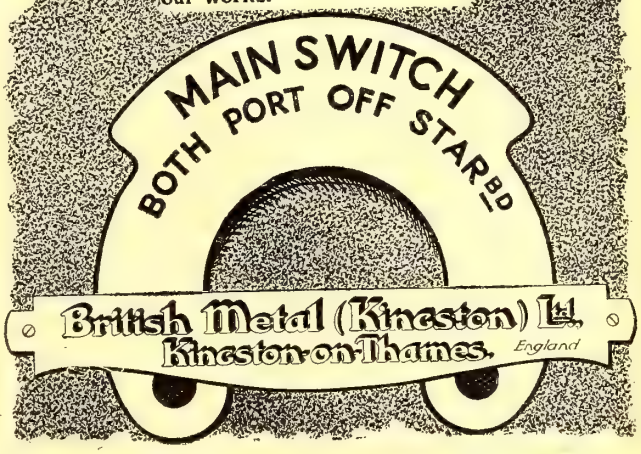
Plates to any Specification

—accurately made of the best materials, unaffected by climatic conditions engraved by us in any quantity.

We make in any metal, ivory, ivoroid and bone.

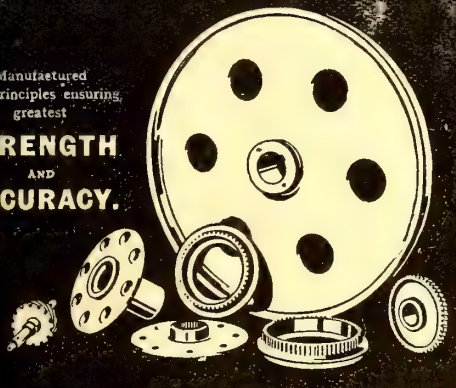
:: :: :: ::

A.I.D. Examiners resident at our works.



OSS— AERO-ENGINE GEARING

Manufactured on principles ensuring greatest STRENGTH AND ACCURACY.



GEARING — FLYWHEELS — CAMSHAFTS
R.A.F. PROPELLER BOSSES.

Our Aero parts are made in specially HIGH TENSILE STEEL, heat treated and all parts corrected for distortion.

TRANSPORT, LORRY & PLEASURE CAR GEARING

Bevel and Worm Drives accurately generated. Steering Worms and Sectors. Spur and Bevel Differentials. Gear Box Gears. Camshafts with guaranteed Glass-hard Cam Profiles.

-GEARING

THE MOSS GEAR CO., LTD.,
W. DUCKITT, Managing Director, Thomas St., Aston, BIRMINGHAM.

Bowden, Controls, AND Cables FOR Aeroplanes

Suitable for all possible purposes.
Quotations submitted on application.

Note Address:—

THE BOWDEN BRAKE CO., LTD.,
TYSELEY, BIRMINGHAM.

BOWDEN TYSELEY Tyseley BOWDEN TYSELEY

B.B.B.

MARRIAGE.

WILD-COOPER.—On June 8th Flt.-Lt. H. Wild, R.N., of Peddie, South Africa, was married to Elaine Cooper, elder daughter of Ernest Charles Cooper, C.E., Shanklin, I.W.

* * *

Flt.-Lt. F. J. Bailey, R.N., arrived in Holland on June 14th, from Germany for internment.

MILITARY.

DEATHS.

D'ARCY.—Sec. Lt. Samuel H. D'Arcy, D.S.O., R.A.F., who was killed on June 8th, was the son of Viscount and Vicountess D'Arcy, of Ladbroke House, Redhill. He was 19 years of age. Mr. D'Arcy was killed while looping a new type of biplane off the ground. He had performed the feat with this machine several times before, but apparently misjudged his distance and failed to flatten out in time. He had seen much service in France and was at the time of his death attached to a testing establishment.

HAMILTON.—Capt. H. J. Hamilton, M.C., D.C.L.I., and R.A.F., who died on June 13th, as the result of a flying accident, was the second son of Mr. and Mrs. A. E. Hamilton, 59, Ridge Road, N.8. He was mobilised with the Artists' Rifles in 1914. He was 23 years old.

MEDLICOTT.—Lt. Harold W. Medlicott, R.F.C., aged 23, who was shot and killed while attempting to escape from the prison camp at Bad Colberg (Sachsen Meiningen), on or about May 19th, was the only surviving son of Mr. and Mrs. J. W. Medlicott, Ealing, W., and a brother of Sec. Lt. S. N. Medlicott, R.F.A., who was killed at Loos on October 6th, 1915. He obtained his commission in the R.F.A. in September, 1914, and shortly after was transferred to the R.F.C. During several months of good work, he proved himself to be a daring and skilful pilot, and was successful in bringing down a number of enemy machines, for which he was mentioned in dispatches. On November 9th, 1915, while on special work, a blinding snow-storm and consequent engine trouble compelled an enforced landing within the German lines, and he has since been interned in various prison camps, from which he made many unsuccessful attempts to escape.

SIMMS.—Sec. Lt. John Basil Palling Simms, 5th Fusiliers, attd. R.A.F., who was killed in action on June 4th, was the only son of the late Henry Simms and of Mrs. Simms, Jesmond Road, Newcastle-on-Tyne. He was 19 years of age

TYRRELL.—Capt. Walter A. Tyrrell, M.C., R.A.F., who has been killed, was 19 years of age. He was one of three soldier sons of Alderman Tyrrell, of Belfast, and was recently awarded the Military Cross for bringing down three enemy aeroplanes within 15 minutes. He had in all 15 German machines to his credit.

Capt. Tyrrell was the younger son of Mr. and Mrs. John Tyrrell, Ballyholme, Bangor, Co. Down, Ireland

VAN RYNEVELD.—Lt. John Percival Van Ryneveld, R.A.F., whose death was announced recently, was educated at Winburg and Grey College, Bloemfontein. He was wounded in 1914 while serving under Commandant Pretorius in the operations against the Rebels. He left South Africa in April, 1917, to join the R.F.C., and was killed in a flying accident near Dartford on June 2nd.

WHITESIDE.—Lt. Miles Bruce Dalzell Whiteside, Highland Light Infantry, attd. R.A.F., who died on June 13th of injuries received while flying in Herts on June 10th, aged 23, was the son of the Rev. M. Whiteside, late rector of St. Nicholas, Cardiff. He joined the Artists' Rifles in 1914, subsequently obtaining a commission in the A.S.C., went out to France in 1914, and transferred to the Highland Light Infantry in May, 1915. He was wounded the following August, and rejoined his regiment in Mesopotamia in May, 1916, and was again wounded in January, 1917. He was temporary A.D.C. to the Lt.-Gov. of Burma, and returned home in October, 1917, to join the R.A.F. He obtained his wings the day of his accident.

ENGAGEMENT.

BARR—WILSON.—The marriage between Capt. A. Douglas S. Barr, R.E. and R.A.F., eldest son of Professor Archibald Barr, LL.D., and Mrs. Barr, of Westerton of Mugdock, and Maude Charlotte, younger daughter of Mr. and Mrs. H. Arnold Wilson, Underfell, Milngavie, will take place in Milngavie and Baldernock U.F. Church on Tuesday afternoon, July 9th, at 1.30. All friends will be welcomed at the church.

MARRIAGES.

ALFORD—CHAMBERLAYNE.—A marriage has been arranged, and will shortly take place, between Capt. Francis R. Alford, M.C., R.A.F., and Rosalie Francesca, daughter of Mr. and Mrs. Hankerville Chamberlayne, of Cranbury Park, Hampshire.

BASS—HALL.—On June 15th, at the Royal Chapel of the Savoy, Lt. K. C. Bass, S.A. Inf. and R.A.F., eldest son of Maj. and Mrs. Bass, Johannesburg, was married to Lois, only daughter of Mrs. Hall, London.

BORWICK—GREY.—On June 8th, at the Chapel Royal of the Savoy, Lt. George Borwick, of the Bedfordshire Regt., attd. R.A.F., was married to Dorothea Gertrude, second daughter of the late Mr. Charles Grey and Mrs. Grey, of Anerley, by the Rev. H. B. Chapman.

HENSHAW—MOORE.—On June 12th, at St. George's, T nell Park, Capt. Albert G. Henshaw, A.F.C., R.A.F., eld son of Alderman J. E. Henshaw, J.P., and Mrs. Henshaw, Englishcombe House, Bath, was married to Winifred Margar eldest daughter of Mr. and Mrs. Moore, of 30, Carleton Ro Tufnell Park, N.

MACLEOD—BRISCOE.—On June 10th, at Kilmacow Chur Ireland, Lt. Norman Harry Neynol MacLeod, R. Scots. Fu attd. R.A.F., late E.I. and C.T. Co., Ltd., elder son of the l Norman Nevile MacLeod, Tirhoot, India, and of Mrs. MacLe was married to Blanche, second daughter of the late Edw. Whitby Briscoe and of Mrs. Briscoe, of Harristown Hou Piltown, Co. Kilkenny, Ireland.

BIRTHS.

COVERDALE.—On June 11th, at "Hillsboro," Albion Ro Sutton, to Joyce, wife of Lt. Harry Coverdale, London Reg attd. R.A.F.—a daughter.

* * *

Sec. Lt. D. C. Tucker, R.F.C., has been missing sin March 24th, 1918. Will friends of prisoners of war in Germa kindly ask for news of him? Any information will be gratefu received by Mrs. Frank Tucker, Durley Park, Keynsha Somerset.

No. 12 SQUADRON, R.F.C. (1916), B.E.F.

Will officers who were serving in the above squadron in Fra in 1916 please communicate giving their present addresses Lt.-Col. J. C. Halahan or Captain Creswell Turner? Rep should be addressed c/o H., THE AEROPLANE.

AIR FORCE.

DEATHS.

BOWICK, PRINCE and SMITH.—A flying accident, result in the death of three aviators, occurred in Norfolk on June 11 Lt. William Robie Bowick, R.A.F., was piloting a mach with Sec. Lt. Harry W. Prince, U.S.A., as a passenger, Sec. Lt. Thomas Eli Smith, R.A.F., was piloting anot machine, when both came into collision and fell to the grou All three officers were dead when removed from the wrecka

COX.—Sec. Lt. Joseph W. Cox, R.A.F., was killed thro a fall caused through performing a roll at a height of 300 over Norfolk on June 13th.

McGILLWERY and WATCHHORN.—Lt. E. G. McGillw R.A.F., and Lt. C. E. Watchhorn, R.A.F., were killed on J 17th through their aeroplane crashing at Thornycroft, Macclesfield.

NUGENT.—Sec. Lt. Anthony Nugent, R.A.F., who was ki while flying on June 1st in his 19th year, was the only son the late John Nugent, late I.C.S., by his second marriage Amy Isabelle, daughter of Herbert Hankey, of 8, Second Aven Hove. He was educated at Middleton House, at Bognor (af wards at Cordwalles), under Mr. M. F. Voules, and at Winch ter, which he left in July, 1917.

PULLEN.—Lt. William Pullen, R.A.F., fell 250 feet in a dive while flying on the south coast on June 13th, and was kil

WELFORD.—Lt. L. C. Welford, R.A.F., aged 24, who the third son of Mr. and Mrs. Welford, of Beechwood, Loughb died on June 8th as a result of wounds sustained while flying France.

ENGAGEMENTS.

CLINKSKILL-ROBERTSON.—An engagement is announ between Capt. James Clinkskill, R.A.F., son of the late Alf A. F. Clinkskill, Glasgow, and Jessie Hay, eldest daughter of late Peter Robertson and Mrs. Robertson, Ingliston, Mount V non, Glasgow.

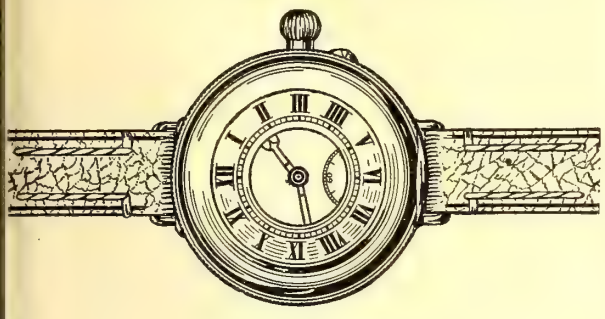
METCALFE—WILSON.—The engagement is announ between Sec. Lt. Maurice L. Metcalfe, R.A.F., second son of late F. W. Metcalfe, of the London Stock Exchange and of Br wood, Essex, and grandson of R. Metcalfe, of The Hyc Richmond, Surrey, and Mabel, youngest daughter of Capt. Wilson (late of the Mercantile Service) and Mrs. Wilson, of Inchmery Road, Catford.

VECQUERAY—AUTON.—The marriage arranged betw Lt. J. G. Vecqueray, R.A.F., of Chaucer Road, Bedford, Phoebe, elder daughter of the late Comdr. Auton, R.N., Mrs. Auton, of Walpole Road, Brighton, will take place qui at St. Matthew's, Brighton, on June 22nd, at 2 o'clock.

WATSON—DALTON.—The marriage of Major John Bal gall Forbes Watson, R.A.F., younger son of the late John W son and Mrs. Watson, Burnbank, Milnathort, Scotland, and A andra Mary Georgie, only daughter of the Rev. Canon J. Dalton, K.C.V.O., C.M.G., and Mrs. Dalton, The Cloist Windsor Castle, will take place at St. Martin-in-the-Fields, Tra gar Square, on Saturday, June 29th, at 11.30. No invitati are being issued, but all friends will be welcome at the churc

WATSON—CRICHTON.—The marriage of Capt. Vi Watson, R.A.F., and Ethel Mary, elder daughter of Mr. and M Lionel A. Crichton, of 17, Portman Street, W., will take pl at the Parish Church, Henley-on-Thames, on Thursday, J 27th, at 1.30. No invitations will be sent, but all friends will welcome at the church, and afterwards at Drayton, Henley.

JEWELLERS BY APPOINTMENT SILVERSMITHS



Patent No. 11376/15.

THE "MILITARY" LUMINOUS WATCH.

A THOROUGHLY reliable and practical luminous watch, indispensable for Naval or Military Service. The "Military" Luminous Watch is the only Screw Case Silver Watch fitted with a "hunter" cover, and is the exclusive patent of The Goldsmiths and Silversmiths Company, Ltd.

As Illustrated £4 12 6 THE Without Cover £3 15 0

GOLDSMITHS & SILVERSMITHS COMPANY LTD.
with which is incorporated The Goldsmiths Alliance Ltd. Estd 1751.

Only one address (no branches):
112, REGENT STREET, LONDON, W.

Royal Air Force

WE supply every requisite, in correct details, for the Royal Air Force. We illustrate the new R.A.F. uniform, correct in every detail and perfectly cut.

Khaki Whipcord or Barathea Service Jacket Prices from £5/15/6

Slacks - £2/10/0

Cap, Badge, and Bar Complete - £1/15/0



Robinson & Cleaver LTD

156-168 REGENT ST. LONDON, W. 1.

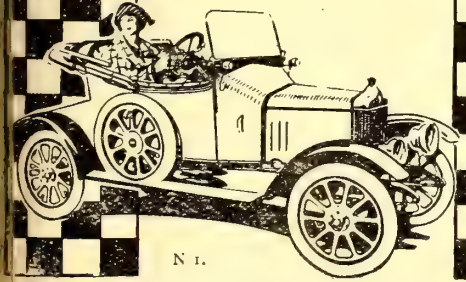
The All British Standard LIGHT CAR

THE essential Car for the Owner - Driver.

Send us your enquiry for particulars of new models as soon as these are available.

THE Standard Motor Co. Ltd Coventry.

London: — The Pytchley Autocar Co., Ltd., 216, Gt. Portland St., London, W 1.



N 1.

SANKEY

Undershields & other Light Stampings for Aeroplanes

Any size or weight: Rough or Machined: Single piece or Combination pressed and welded by Oxy-acetylene and other processes.

JOSEPH SANKEY & SONS Ltd

Hadley WELLINGTON, Shropshire.

MARRIAGES.

BLACKWOOD—STEWART.—On June 13th, at New Kilpatrick Parish Church, Maj. John Blackwood, R.A.F., only son of G. Marshall Blackwood, Craigton, Milngavie, Dumbartonshire, was married to Marion Symington, second daughter of Lord Provost and Mrs. J. W. Stewart, Glasgow, by the Rev. J. H. Dickie, M.A.

BREMNER—HURD.—The marriage of Capt. F. D. H. Bremner, R.A.F., elder son of Capt. Donald Bremner, Assistant Commissioner of City of London Police, and Mrs. Bremner, and Miss Vivyen Hurd, daughter of Mr. and Mrs. Archibald Hurd, took place at All Saints', Margaret Street, W., on June 13th, the Rev. Hyla Holden, uncle of the bridegroom, and the Rev. Roscow W. Sheddon officiating.

DAND—PLATT.—On June 11th, at Holy Trinity Church, Barnes, S.W., Lt. J. H. Dand, R.A.F., was married to Doris Mary Augusta, elder daughter of John Crawfurd and Mrs. Platt, of Barnes, S.W., and Tankerton, Kent, by the Rev. R. B. Dand (brother of the bridegroom), Vicar of Brockham, assisted by the Rev. H. C. Woodhead.

DRAPER—WEBSTER.—On June 11th, at St. Thomas's Church, Rickmansworth, Lt. Thomas Makin Draper, R.A.F., only son of Dr. T. Makin Draper and Mrs. Draper, Rickmansworth, was married to Lilian Mary, younger daughter of Mr. and Mrs. Henry Webster, of Lynsters, Rickmansworth.

HIGGIN—EARLE.—On June 11th, at St. Nicolas Church, Burton, Cheshire, Maj. Walter Wynnefield Higgin, R.A.F., only son of W. Sinclair Higgin, "Woodlands," Formby, Lancs, was married to Olive, only daughter of Arthur B. Earle, The Old Hall, Puddington, Cheshire.

JEPSON—BRACE.—On June 14th, 1918, at Ullet Road Church, Liverpool, Capt. Rowland Walter Jepson, R.A.F., late Cheshire Regt., only son of Mr. and Mrs. J. W. Jepson, of Murivance, Shrewsbury, was married to Margaret, elder daughter of Mr. and Mrs. George R. Brace, of Ballymore, Queen's Drive, Liverpool, by the Rev. Joseph Wood.

KYFFIN—WILLS.—The marriage arranged between Lt. John Trevor Kyffin, R.A.F., and Miss Margaret Joyce de Winton Wills, took place at the Church of the Holy Cross, Ramsbury, Wilts, on Wednesday, June 19th.

STUBBS—KEMP.—On June 13th, at St. Barnabas Church, Southampton, Lt. Arthur Duncan Stubbs, R.A.F., eldest son of Mr. and Mrs. Stubbs, of Leeds and Southampton, was married to Viola Gwendoline, youngest daughter of Mr. and Mrs. G. S. Kemp, of Upper Cedar Road.

BIRTHS.

BEST.—On June 17th, at 6, Park Gardens, Glasgow West, Beryl Gladys (*née* Smith), the wife of Lt. Robert Dudley Best, R.A.F.—a daughter.

BIRD.—On June 8th, at "Bosgrove," The Ridgway, Chingford, to May Eveline (*née* Pemberton) and Alfred Harry Bird, Lt., R.A.F.—a daughter.

HAWKINS.—On June 12th, at 3, The Park, Highgate, Margaret (*née* Lacey), the wife of Captain R. M. Hawkins, R.A.F.—a son.

* * *

Capt. J. C. Harrison, R.A.F. (Middle Temple), was called to the Bar on June 12th.

FOREIGN COMMUNIQUES.

FRANCE.

JUNE 11th.—Our daylight bombarding squadrons continued their operations during the day of June 10th, notwithstanding the bad weather. On the most exposed points of the battlefield some groups of machines, flying at a low altitude, dropped their bombs on the enemy concentrations, dispersing the reinforcing troops and causing them considerable losses.

Certain crews made several trips in the one day. Eight tons of explosives were employed in this manner, and yielded the best results.

During the night of June 10th and 11th the bombardment of the rear zone of the enemy front was actively continued. Our squadrons dropped 20 tons of bombs on convoys, cantonments, and railway stations. Two munition depôts were exploded, the one situated in the Chaulnes region and the other in the Soissons region. A fire was also reported in the railway station at Fismes. During the same day (June 10th) four enemy machines and a German captive balloon were brought down by our chasers.

JUNE 12th.—Our day bombing squadrons continued their operations yesterday, participating with their customary boldness in the counter-attack launched by us on the front Montdidier-St. Maur. They attacked with bombs the enemy divisions which were coming up to meet the shock of our troops against their right wing. Before this attack the enemy units were compelled to scatter, leaving corpses on the ground.

Convoys were bottled up, and batteries of heavy artillery in full blast were abandoned by the gunners and ceased fire. Moreover, a convoy caught fire, and a huge fire broke out in Ressons-sur-Matz, where there was a large concentration of enemy troops.

Altogether 26 tons of projectiles were dropped with excellent results.

During the night our bombing crews dropped 13 tons of explosives on the stations of the enemy zone, particularly in the region of Nesles, Roye, and Ressons-sur-Matz. Fresh fires were observed at the places bombed.

On the 11th our chasing crews brought down or put out of action 13 German machines.

JUNE 13th.—On Wednesday, our bombing squadrons dropped on the battle zone 16 tons of projectiles and 25 tons during the night of June 12th-13th.

Cantonments, convoys, troops on the march, and the rear of the enemy front were bombarded, as well as the villages of Ressons-sur-Matz, Ricquebourg, Orvillers-Sorel, and the regions of Roye and Guignicourt. Several outbreaks of fire were observed.

The same day seven enemy machines were brought down and nine put out of action.

During the first week of the month of June 13th enemy machines were brought down by our anti-aircraft defence service.

JUNE 14th.—On June 13th our chasing aeroplanes shot down five German machines and two captive balloons. Seven other enemy machines were put out of action.

During the night of June 13th-14th our bombing aeroplanes dropped 19 tons of projectiles on the establishments, railway stations, and cantonments in the enemy zone, causing much damage.

JUNE 16th.—Several groups of aeroplanes crossed the French lines last evening, and proceeded in the direction of Paris. The alarm was given in Paris at 11.40 p.m., and our air defences were put into action, our batteries shelling the raiders violently. Some bombs were dropped. There were several victims, and some material damage was done. The "All clear" was given at 12.45 a.m.

JUNE 17th.—ARMY OF THE ORIENT.—Two enemy aeroplanes were brought down.

GERMANY.

JUNE 13th.—In the two last days 35 enemy aeroplanes were shot down.

Capt. Berthold and Lt. Meckoff obtained their 33rd aerial victory, First-Lt. Schleich his 29th and 30th, Lt. Veltjens his 20th and 21st, and Capt. Reinhardt his 20th.

JUNE 14th.—Twenty-eight enemy aeroplanes were shot down yesterday. Capt. Berthold obtained his 34th aerial victory, Lt. Udet his 29th, and 1st Lt. Lörzer his 25th.

The losses of the enemy's Air Forces on the German front for the month of May amount to 23 captive balloons and 413 aeroplanes, 223 of which fell behind our lines and the rest on the other side of the enemy's positions.

We have lost in the fighting 180 aeroplanes and 28 captive balloons.

JUNE 16th.—Lt. Meckhoff has obtained his 34th aerial victory, Lt. Udet his 30th, and Lt. Kirschstein his 25th and 26th.

JUNE 17th.—Eight enemy aeroplanes and eight captive balloons were brought down yesterday.

AUSTRIA.

JUNE 14th.—At the repulse of an aerial attack made on Cattaro an English aviator was shot down by our naval aeroplanes.

ITALY.

JUNE 10th.—At dawn yesterday a squadron of Austrian seaplanes flew over Brindisi, dropping several bombs. No damage was done to war material, but several persons were killed or wounded. Our anti-aircraft guns and chaser planes soon compelled the Austrian squadron to withdraw. The loss of three enemy machines is reported. The enemy aviators were taken prisoners.

The same day British aeroplanes bombarded the aerodrome and hangars at Cattaro. Italian aeroplanes in two successive attacks bombarded military establishments at Durazzo. At Cattaro a steamer moored near the aerodrome was observed to be on fire. All the British and Italian machines returned undamaged to their bases.

JUNE 13th.—Bad weather limited the activity of aviation.

JUNE 14th.—One enemy aeroplane was brought down. One of our airships in difficult atmospheric conditions carried out effective bombardment operations.

JUNE 16th.—Our own and Allied aviators are taking a strong part in the battle by bombarding the crossing points on the Piave and attacking the enemy's massed troops with machine-gun fire. Thirty-one enemy aeroplanes have been brought down.

JUNE 17th.—The aviation service has continued to take a very valid part in the fighting, notwithstanding unfavourable flying conditions.

Forty-four enemy machines have been brought down during the last two days.

U. S. A.

JUNE 13th.—Last night our aviators bombed with good effect the station of Dommary-Baroncourt, north-west of Metz. All our machines have returned.

JUNE 14th.—Yesterday our aviators shot down two hostile machines.

JUNE 15th—Our aviators bombed the station and railway tracks at Conflans (north-west of Metz). A number of direct hits were made. All our machines returned.



E. R. Calthrop's Aerial Patents, Ltd.
Eldon St. House, Eldon Street, London, E.C.2

Telephone (2 lines)—
LONDON WALL 3266 & 3267.

Telegraphic Address—
"SAVEMALIVO, AVE, LONDON

When Fitting-up your Works
AND OFFICES
or Contemplating Alterations

SEND TO

THE CAMDEN CONSTRUCTION CO., LTD.

289, HIGH STREET,
CAMDEN TOWN, N.W.1,

and a Representative will wait on you, submit a scheme and guarantee a time of completion.

Propeller, Engine and other Cases a Speciality.

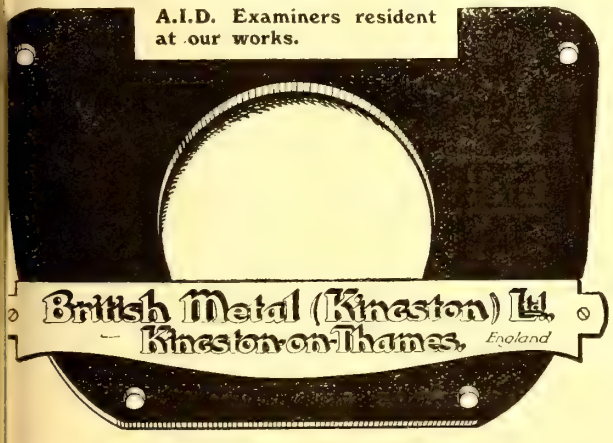
DISTANCE NO OBJECT.

Sheet Metal parts

—are our speciality. We turn them out true to design carefully finished and because made from selected material—entirely reliable.

R.E., F.E., B.E., S.E., De H.

A.I.D. Examiners resident at our works.



THE demand for National Service of our entire output of the famous Bowden Wire Mechanism—which provides the perfect method of transmitting power by a tortuous route—prevents our acceptance for the present of any orders except those classified under a high priority.

Established 1897.



Godbolds

TURKEY.

UNDATED.—On June 11th enemy caravans and camps were bombarded by our aviators. One enemy machine was shot down on June 8th.

JUNE 14th.—The encampment (of the Meccan troops) in the neighbourhood of Tafile (south of the Dead Sea) was subjected to bombing attacks and machine-gun fire from our aeroplanes.

THE WAR IN REVIEW.

U.S.A. Finance.

It was reported from Washington on June 11th that a Bill for a Federal-controlled Corporation of £20,000,000 to build aircraft has been introduced in Congress.

A Burn Out.

It was stated on June 16th that a fire broke out at a new aerodrome established at Nivelles and the whole place was destroyed, with its contents of 15 new Gothas, just arrived from Germany.

Two German non-commissioned officers have been arrested. It is believed they were responsible for the fire.

The Death of a French Ace.

It is reported that Flt. Lt. Marty, the French aviator, was killed in action on June 9th. Lt. Marty had seven victims to his credit.

An Untiring Hun Killer.

Lt. Nungesser, although still under treatment at the American hospital, took advantage of the fine weather to return to the front, and on June 13th brought down two enemy biplanes in four seconds, thus bringing the total number of his victims up to 38.

Showing up the Enemy.

The "Kölnische Volkeszeitung" recently published an article describing the great popularity of the German War Air Fleet Exhibition, which was visited by over 44,200 people on Whit Sunday and Whit Monday. Military bands play on Sundays, holidays, Wednesdays, and Saturdays.

The people of Cologne are flocking to this very apposite Exhibition, where, in response to many requests, lectures, with demonstrations, are daily given on bomb throwing, from which the people derive valuable instruction concerning the best way to behave during a hostile air attack. The lecturers show how bombs are thrown, and give demonstrations of their arrangement in aircraft and their liberation therefrom, while from a tower a miniature air raid is carried through, clearly showing the public the tactics of bomb attack.

[It is a pity that educative exhibitions are not open in this country on Sunday, which is the only day of the week when people have any right to spare time. One had hoped that the excellent show which the Countess of Drogheda has been taking round the British Isles would have been expanded into something on a big scale similar to this and previous German exhibitions. Is it too late for that energetic lady to go ahead with the organisation of a properly arranged exhibition of enemy aircraft?—Ed.]

An American Pilot's Death.

Through a faulty landing in Norfolk, on or about June 14th an American aeroplane tester, named Sam Campbell, was killed.

The Second American "Ace."

The "Times" correspondent with the American Army in France writes on June 15th:—

The French have to-day officially confirmed Lt. Eddie Rickenbacker, of Columbus, Ohio, as the second all-American-trained air "ace." Douglas Campbell, of California, was the first.

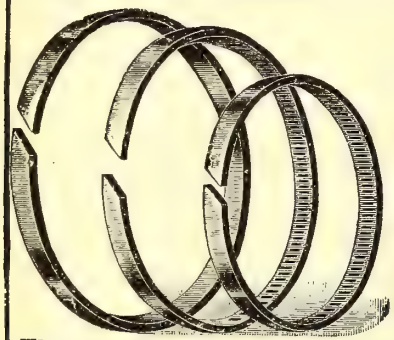
Rickenbacker was formerly a speed "king" in American motor-car races, and is well known for his daring driving. He landed his first German aeroplane on April 29th and his last on May 30th, though unofficially he has other German machines to his credit. He came to France a year ago in the motor-car service, but soon transferred to the Air Service, where he has become one of America's best and most successful fliers.

EBORA PROPELLER Company
11 & 12 Surbiton Park Terrace KINGSTON on Thames
Telephone KINGSTON 672
Telegrams EBORA, KINGSTON

Ebora Propellers

Contractors to the Admiralty and War Office
SCHOOL PROPELLERS
FOUR BLADERS
SEAPLANE PROPELLER
SLATE TABLES For PROPELLER WORKS

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.
Telephone No. 2149.
Telegrams—"Ocean," Sheffield.
The Standard Piston Ring & Engineering Co., Ltd.
Don Road, Sheffield.

CHAUVIÈRE'S
Integral Propellers



are used more extensively than any other Propeller in the World.
Hold all Records and are indisputably the best.
Maximum Efficiency.
Best Workmanship.
THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

AEROPLANE TANKS AND COWLS.
BEST WORKMANSHIP.
—QUICK DESPATCH.—
ZEPHYR VENTILATING Co. Ltd.,
LYPPIATT ROAD, BRISTOL.
Telegrams:—"ZEPHYR," BRISTOL.

HEATING AND VENTILATION

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. Wire: "KINNELL-BOROH-LONDON."

CHAS. P. KINNELL & Co., LTD., SOUTHWARK ST., LONDON, S.E.1

AERO-PLANE STEEL PARTS

When requiring Aeroplane Parts write US — we can supply —

Tubes & Tubular Construction, Sheet Metal Pressed Parts, Wheel Rims, Special Sections in Steel, Brazing, Acetylene and Electric Welding, etc.

Any Special Parts made to order. Send your enquiries.

The LOMBARD Rim and Tube Co., Birmingham.

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET, BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

R. F. & F. W. BROWN

(F. W. BROWN.)

Wollaton
Near Nottingham

ENGLISH ASH FOR AEROPLANES

Bent Timber Manufacturers.

Telephone .. 1526 Nottingham. **Telegrams .. Browns, Sawmills, Wollaton.**

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

THE

"HELICOID" LOCK-NUT

(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅛in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.

WOLVERHAMPTON.

London Offices: 139/141, CANNON ST., E.C.4.

Telegraphic Address: POETRY, 'PHONE LONDON.
Telephones: AVENUE 995, 996, 7996.

(Partners: H. W. PRITT, W. G. PRITT, P. W. SMALLWOOD, E. R. HILL),

PRITT & CO.

METAL WAREHOUSEMEN, MUNITION AND AERONAUTICAL CONTRACTORS

46, FENCHURCH STREET, LONDON, E.C. 3,

Where all communications must be addressed.

CITY WAREHOUSES: 62a & 64, Vine Street, Minories E.C.
DEPOTS: Paddington, Poplar, Shoreditch.

We hold good stocks, complying with Air Board, R.A.F. and Admiralty Specifications, of the following:

BRASS & COPPER in sheets, tubes, rod, wire, etc.
TINNED STEEL SHEETS.
MILD STEEL SHEETS, 9a.
BRIGHT DRAWN MILD STEEL BARS, 5a.
A. G. S. BOLTS, NUTS AND WASHERS.
COPPER RIVETS. TINMAN'S SOLDER.
SOLDERING IRONS.
BEST SWEDISH WELDING WIRE.
BRAZING SOLDER in wire and granulated Form.
SILVER SOLDER. WIRE GAUZE, &c.

All material passed A.I.D. before despatch.

DAILY DELIVERIES made by our own vans within a radius of 15 miles of our Warehouses.

NOTE.—All orders for Aeronautical Work receive especially prompt attention.

WE ARE BUYERS OF SCRAP BRASS & COPPER.

THE

BRITISH WRIGHT

CO. LTD.

Owners of the British, Italian and Belgian Patents of Wilbur and Orville Wright.

Manufacturers of

AERONAUTICAL INSTRUMENTS

FOR

NAVY & ARMY AEROPLANES

Ogilvie Air Speed Indicators

For use on Aeroplanes, Airships, Kite Balloons and Air Stations.

Statoscopes.
Recording Manometers.
Wind Speed Recorders.

At present the Government is taking the entire output, but British and Foreign Firms are invited to place their orders now for delivery of Aeronautical Instruments after the war.

The BRITISH WRIGHT Co. Ltd.

33, CHANCERY LANE, LONDON, W.C.2.

CONTRACTORS TO H.M GOVERNMENT



W.T.CLARK & CO

Telephone No. Central 2121.

5, GREEN TERRACE, ROSEBERY AVENUE, LONDON, E.C.1.

Telegrams Etalspinner Isling London Two Words

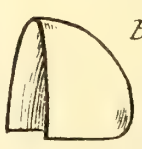
METAL SPINNERS and SHEET METAL WORKERS

for Aeroplane Constructors

METAL SPINNINGS for AEROPLANES

Cowlings (COMPLETE SET)
Coverings
Undershields

Fairings
Petrol Tanks
Shields etc.



BEATEN COWLS OF EVERY DESCRIPTION

SPUN COWLS UP TO 48 INCHES IN DIAMETER.



SHENSTONE & Co., LTD.
AIRCRAFT DEP.
LEYTON.

AIRCRAFT PRODUCTION WITH MODERN METHODS.

E. KEITH DAVIES, General Manager. Telephone: WALTHAMSTOW 24.

"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G.
COMPANY, LIMITED,

Telegrams:
"Cellulate, London." **8, WATERLOO PLACE, S.W.1.** *'Phone: Regent 4045.*
Also at Spondon, Derby; and Maybury Gardens, High Road, Willesden Green, N.W.10.
(Telephone: Willesden 2380.)

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE ROYAL AIR FORCE.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

THE SIBERIAN & GENERAL TRADING CO., LTD.
Can supply from stock or for prompt shipment
PLYWOOD
IN ALL WOODS, SIZES AND THICKNESSES.
SPECIALITY: BOARDS FOR AIRCRAFT WORK.
HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. **Telephone—London Wall 3577.**

HIDE GLUES

FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.

— APPROVED —

Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.

Telephone: 4978 Avenue

THE

"BOWSER" AEROPLANE SEATS

Under the A.I.D. Inspection

(Made to A.G.S. Drawing 264).

Supplied to the Royal Aircraft Factory and the Lead ng Aircraft Manufacturers.

EDWARD BOWSER, 50, Park Lane, Leeds. Tel. No.: Central 3473.

Northern Representative—
Mr. WALTER M. DANIELL,
33, East Beach, Lytham.

Telephone—Works: East 3832, 3833. Offices: 3474 Gerrard. Telegraphic Address—"Extouboul, London."

THE STANDARD Aircraft Manufacturing Co., Ltd.

CONTRACTORS TO H.M. ADMIRALTY AND AIR BOARD.

Head Office: SAVOY HOUSE, Corner of Savoy Street, STRAND, W.C.2.

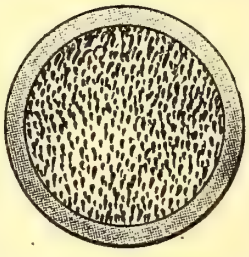
Also at 28, BOW COMMON LANE, LONDON. E.3.

Lang Propeller LTD.

Contractors to the Admiralty a d War Office.

WEYBRIDGE, SURREY.

ANTOL CASE HARD



Harden your Screws and Gauges with ANTOL.
IT LEAVES NO SCALE.

PIDGEN BROS.

25, Helmet Row, Old St., London, E.C.1.

THE POOLE AVIATION CO

POOLE, DORSET.

Contractors to H.M. Government.

Spares and all Parts of Machines.

ENQUIRIES INVITED.

'Phone: Poole 54. 'Grams: Aviation, Poole.

Aeroplane Steel Sheets

as supplied by us to

The Royal Aircraft Factory and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 3A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

SMETHWICK, BIRMINGHAM

Telegraphic Address: "Bernico," Birmingham. Telephone No.: 224 Smethwick.

PIN YOUR FAITH TO A NAMED PIN



THE NAME BEHIND THE PIN

SPLIT OR SOLID, ANY SIZE OR TAPER

FREDK. MOUNTFORD (B'ham.) Ltd.
FREMOLAND, LIFFORD,
BIRMINGHAM.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

The Camden Construction Co., Ltd.

MANUFACTURERS OF

FAIRINGS OF EVERY DESCRIPTION

WOOD ONLY OR FABRICED AND DOPED OR VARNISHED.

ALSO

SKIDS OF EVERY TYPE.

GUARANTEED DELIVERIES.

89, High St., Camden Town, N.W.1

METAL FITTINGS FOR A. V. ROE PLANES.

BRACING PLATES

Drawing SS 172. Items 2, 3, 4 and 5.
Drawing SS 190. Item 4.
Drawing SS 264. Items 2, 3, 4, 5 and 6.

ALSO

COVER PLATES

Drawing F 80. Item 24.
Drawing F 80. Item 25.

A. LLOYD & SONS, LTD.,
Pier Wharf, Deptford, S.E.8, London.

SALMSON AERO-ENGINES

(Canton-Unné System).

All enquiries should be addressed to

THE DUDBRIDGE IRON WORKS, Ltd.
STROUD,
GLOUCESTERSHIRE.

London Office:
87, *Victoria Street, S.W.1,*

Manufacturers of **PHOSPHOR BRONZE,**



GUN METAL,
MANGANESE BRONZE,
BRASS & COPPER,
TUBES, SHEETS, RODS, WIRE, AND
CASTINGS.
PHOSPHOR TIN,
PHOSPHOR COPPER.

CHARLES CLIFFORD & SON, LTD.,
BIRMINGHAM.

Aluminium Castings

Sand or Die of every Description
2 H.P. to 600 H.P.
BEST METAL
GOOD CASTINGS
QUICK DELIVERIES

Contract to H.M. Government
Chill Castings for Aeroplanes a Speciality.

Telephones: 3846 City. 4879 Central. Telegrams: Kranksases, Isling London

R. W. COAN
219, COSWELL ROAD, LONDON, E.C.

COAN CASTS CLEAN CRANK CASES

The Air Navigation Co., Ltd.

BLERIOT & SPAD,

ADDLESTONE (SURREY).

Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director,

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

"CROID"

LIQUID GLUE

as adopted by
H.M. Department of Aeronautical Supplies for Aircraft Construction,

THE IMPROVED LIQUID GLUES COMPANY, Ltd.
Great Hermitage Street, London, E.1.
Phone: Avenue 3173. Tel.: Excroiden, 'Phone, London



TRADE CARDS.

AEROPLANE TIMBER SPECIALISTS

JOSEPH OWEN & SONS, Ltd.,
Borough, LONDON, S.E.
Telephone: HOP 8811 Telegrams: "BUCHERON, SEDIST."

GODBOLDS
for *GOOD* Advertising
Ernest H. Godbold, Director GODBOLDS' 8 Breams Buildings LONDON E.C.4

NAME PLATES and LABELS
AEROPLANE INSTRUMENT PLATES, DIALS, SCALES, &c.
MACHINE AND CHEMICAL ENGRAVING AND STAMPINGS.
ALBION M.M. CO., 68, VICTORIA ST., S.W.1.

FREDERICK WARD,
Full Right Up With Machine Work.
CAN STILL UNDERTAKE PATTERNS AND SMALL HIGH-CLASS ASSEMBLIES, MACHINE PARTS TO BE SUPPLIED.
ALLSOP ST., UPPER BAKER ST., N.W
'Phone—PADDINGTON 4743.

Clegg Metal Engraving Co.
Chatsworth Works, Worthing,
For Dials, Scales, Name-plates and Address Plates, and Instruction Plates, in Metal, Ivorine, Etc.
Either Chemically Engraved or Machined.

PEGAMOID BRAND LEATHER CLOTH
The Best Waterproof Covering for Railway, Tramway, Aeroplane, Motor Boat, Cushions, Seats, etc.
Sole Manufacturers: NEW PEGAMOID LIMITED, 134 Queen Victoria St. London E.C.
Telegrams—Pegamoid, Phone, London.
Telephone—City 9704 (2 lines). Cables A B C 5th Edition and Private.

Springs! Springs! Springs!
We make a speciality of Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd
All Metal Parts for Aircraft made, comprising the following machine work: **Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work.** Well-equipped Welding and Brazing Plant
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

Clean Coloured Rags
FOR CLEANING & WIPING.
Best and Cheapest for Munition Works :: Engineers, Printers & Bus Companies, etc.
A. JOSEPH, EARL STREET, LONDON ROAD, LONDON, S.E.1.
Telephones: Hop 83, 361 & 4272. "Cheaper than cotton waste."

BRAZING AND SILVER :: :: SOLDERING.
J. W. KING,
36, ST. JOHN'S SQ. LONDON, E.C.1.
TELEPHONE - - CITY 5238.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING MACHINES.
RUSSELL BROTHERS, Ltd., REDDITCH

Trade **MENDINE** Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS, these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per line. the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1.

PATENTS.

ROWLINGSON, Chartered Patent (Consulting Engineer, Mr. S. E. .M.Inst.C.E.), 27, Chancery Lane, W.C. Tel. 332 Central.

kerrett (H. N. Skerrett, A.I.A.E., .E., Associate I.E.E., Fellow of the l Institute of Patent Agents) Patents, nd trade marks.—24, Temple Row, ham.

Wilson, Chartered Patent Agent, d United States Patent Attorney, eet Chambers, Coventry.

s advised free. Write for booklet.— Patent Agency, Ltd., 165, Queen Street, London. 30 years' references.

Popplewell and Co., Patent Agents sulting Engineers. Applications for attended to in all countries.—38, Lane, W.C. Telephone: 1763 Cen- cular free.

ITUATIONS VACANT.

akers, Patternmakers, Coachbuilders, rs and **Joiners,** with experience of e work, or men desirous of obtaining e work, required in Nottingham dis- o person already engaged on Govern- rk or residing more than 10 miles ill be engaged.—Apply by letter to . 3669, THE AEROPLANE, 166, Picca- .1.

ie Erectors, Engine Fitters, Wood- and Wood Machinists wanted at N.W. London. Must be really good n. No one already on Government living more than 10 miles away will loyed.—Apply, Box No. 3672, THE NE, 166, Piccadilly, W.1.

wanted with knowledge of drawing ing for aircraft works, Southampton No one on Government work need Apply your nearest Employment Ex- mentioning No. A5434.

ie Erectors wanted, with good experi- lso engine fitters, with aeroplane or xperience on engine fitting, required e factory near Liverpool. Also several laying out operations and materials. ave machine shop and drawing office ice. No person already on Govern- work will be engaged.—Apply your Employment Exchange, mentioning 127.

t Draughtsman required with aircraft ice, immediate. Good wages. Fare the works, which are in South Wales. on Government work need apply.— tions must be made through your Employment Exchange, mentioning er and No. 3639.

e Factory in N.W. London, manufac- machines of their own design, require ber of detail draughtsmen with first- ronautical experience. Exceptional op- ties and permanent positions offered to men. No one at present engaged on ment work or resident more than 10 way need write to Box No. 480, Sells, 68, Fleet Street, E.C.4.

Beaters wanted for cowls, etc. Air work. Good wages. S.E. London dis- No one already engaged on Government r resident more than 10 miles away need —Write, Z.J., 891, care Deacon's Ad- g Offices, Leadenhall Street, E.C.3.

lass Engine Fitters required, used to car uls. Those already engaged on Govern- work or residing more than 10 miles eed not apply.—Renault, Ltd., Seagrave West Brompton, S.W.6.

lass Wiring Hand. Must be used to 50 ire. No one already engaged upon ment work or living more than 10 miles need apply to "Burton's," London Station, G.E.R., Hackney.

Woodworking Machinists, namely spindle hands, four cutter hands, and deep sawyers. Good wages and overtime and first-class working conditions to really good men. No one residing more than 10 miles away or engaged on Government work need apply.—Apply, Gramaphone Co., Ltd., Hayes, Middlesex.

The following vacancies must be immediately filled at FLYING School out of London district: — PILOT-INSTRUCTORS, ERECTORS and CARPENTERS, AERO ENGINE MECHANICS and FITTERS. Decided preference will be given to those with previous experience of CAUDRON machines and GNOME engines. Must be reliable men, competent to assist and instruct pupils, and take interest in work. No person already on Government work will be engaged.—Apply, stating experience in detail, medical category, age, etc., and lowest wage accepted, to your nearest Employment Exchange, quoting this paper and No. A.5455.

Twelve Draughtsmen required for experimental department of aircraft works, London, N.W. Permanent positions and good salary for competent men. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3683, THE AEROPLANE, 166, Piccadilly, W.1.

First-class Setter-Out and **Jig Maker** required, thoroughly used to aircraft work. Top rate of pay for good man. No one residing more than 10 miles away or already engaged on Government work need apply.—Box No. 3684, THE AEROPLANE, 166, Piccadilly, W.1.

PANEL BEATERS
WANTED FOR
AEROPLANE COWLINGS.
North-Western District.
No one on Government work or living more than 10 miles away need apply.
Write Box **No. 3695, "THE AEROPLANE," 166, Piccadilly, W.1.**

First-class Woodworkers required, thoroughly used to aircraft work, assembly, and parts. Top rate of pay for good men. No one residing more than 10 miles away or already engaged on Government work need apply.—Box No. 3685, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted Fitters for sheet metal parts for aeroplanes; also tinsmiths, used to tanks and fairings. Eastern district. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3686, THE AEROPLANE, 166, Piccadilly, W.1.

Draughtsman, by Midland aircraft manufacturers. Good man, to take charge of small drawing office, progress, and costings. Full particulars as to experience, salary, and when disengaged. No person already on Government work will be engaged.—Apply, your nearest Employment Exchange, mentioning A.5491.

Smart Young Lady of good education required to assist general manager of important aircraft company, mainly in connection with correspondence. Must be accurate shorthand typist, intelligent, not afraid of work other than shorthand typewriting, and anxious to improve her position by taking advantage of the opportunity the vacancy offers. Applications, which will be treated in strictest confidence, must give fullest details of past experience; if possible, be accompanied by copies of testimonials. No one at present on Government work or residing more than 10 miles away will be engaged.—Box No. 3689, THE AEROPLANE, 166, Piccadilly, W.1.

Fuselage Builders, Final Erectors, required; men used to Sopwith machines preferred. No one residing more than 10 miles away or already engaged on Government work need apply.—Hooper and Co., Ltd., East Lane, North Wembley.

Buyer required, with knowledge of engineering accessories for London aeroplane factory. No person resident more than 10 miles away or already on Government work need apply.—Reply, stating age, full particulars of qualifications, and salary required, to Box No. 3692, THE AEROPLANE, 166, Piccadilly, W.1.

Aeronautical Draughtsman required to act as assistant draughtsman in factory, London district. No person resident more than 10 miles away or already on Government work need apply.—Reply, stating age, full particulars of qualifications, and salary required, to Box No. 3693, THE AEROPLANE, 166, Piccadilly, W.1.

First-class Lady Wire Slicers required for aeroplane controls. No person resident more than 10 miles away or already on Government work need apply.—Reply to Box No. 3690, THE AEROPLANE, 166, Piccadilly, W.1.

Jig and Tool Draughtsman required for aeroplane factory, London district. Previous experience of aircraft work preferred, but not essential. No person resident more than 10 miles away or already on Government work need apply.—Reply, stating age, full particulars of qualifications, and salary required, to Box No. 3691, THE AEROPLANE, 166, Piccadilly, W.1.

Required at once, progress man, good wages and conditions; preferably technical man, and one used to aircraft. One hour from London. No person resident more than 10 miles away work will be engaged.—Applications must be made through your nearest Employment Exchange, mentioning this paper and No. 3696.

SITUATIONS WANTED.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Thorough all-round practical engineer, aged 33, is open to immediate engagement as assistant works manager or general foreman; wide experience of engine building and rapid production of aeroplane parts; tactful control of male and female labour.—Apply Box No. 3671, THE AEROPLANE, 166, Piccadilly, W.1.

Advertiser, 35 years' practical experience in sheet metal department, fitting, and machine shop. Expert craftsman, open for engagement as works manager; prepared to consider any position where brains, skill, and hard work are essential and appreciated. Must be a firm of repute, building complete machines. London preferred.—Box No. 3651, THE AEROPLANE, 166, Piccadilly, W.1.

Manager of Propeller Works disengaged shortly desires position, similar or otherwise. Ten years' practical aircraft experience, designing and construction. 46. Has had excellent results in employment and teaching of female labour.—Box No. 3650, THE AEROPLANE, 166, Piccadilly, W.1.

Assistant Works Manager desires situation; expert knowledge of machine shop practice, estimating, costing, and rate-fixing. Tool room and drawing office experience, aero engine, and aircraft metal parts. Nineteen years' sound experience. Good organiser, strict disciplinarian.—Box No. 3646, THE AEROPLANE, 166, Piccadilly, W.1.

Advertiser seeks post as assistant designer; three years' experience of aeroplane design, including stress work, performance, stability, and propeller design.—Box No. 3678, THE AEROPLANE, 166, Piccadilly, W.1.

Designer of aeroplanes will shortly be free and open for re-engagement. Over 10 years' experience of aeroplane design. Latest fighters, bombers, and seaplanes.—Box No. 3680, THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.—continued.

Progress Manager, able to control and organise progress department and distribute work to shops, desires change; 3½ years' experience in well-known firms of up-to-date methods of aircraft production, records, statistics, etc. Must be within 20 miles of London.—Box No. 3679, The Aeroplane, 166, Piccadilly, W.1.

Engineer (discharged) desires position of trust in aircraft factory. Will undertake to start new factory with view to partnership. Experienced in all types of machines from first stage to final inspection, and capable of economically increasing production.—Box No. 3681, The Aeroplane, 166, Piccadilly, W.1.

Foreman Engineer and **Good Tool Designer** for repetition work wants change; present situation 12 months; rejected; aged 37. Apply Messrs. Tamplen and Mahovski, Ltd., Bell Street, Reigate, Surrey, for references.—R. R., "Glenleigh," Berkheads Road, Reigate, Surrey.

Chief Buyer, at present with leading provincial aeroplane concern, desires change; London district preferred. Four years' aeronautical experience. Thorough knowledge Air Ministry specifications and current procedures.—Box No. 3682, The Aeroplane, 166, Piccadilly, W.1.

Foreman Fitter seeks engagement. Practical man, well up in aircraft fittings. Capable organiser and good experience.—Apply, Box No. 3687, The Aeroplane, 166, Piccadilly, W.1.

Managing Clerk (26), ineligible, good buying, commercial, and works office experience; thoroughly reliable; excellent references. Ten years' engineering, aeroplane radiators, and ironmongery trades, disengaged.—Advertiser, 51, Oakwood Avenue, Mitcham, Surrey.

Man seeks situation as foreman of woodworking department. Eight years' references general foreman. Low category. Abstainer. Good knowledge of aeroplane construction.—Write, Box No. 3697, The Aeroplane, 166, Piccadilly, W.1.

As Works Manager with progressive firm. Energetic, smart, capable; 20 years' experience purchase and conversion timber; 2½ years' aeroplanes.—Box No. 3698, The Aeroplane, 166, Piccadilly, W.1.

Buyer, with wide continental and British aeronautical and automobile commercial experience, desires appointment with financially sound company. Thorough knowledge of all markets, materials, machines, tools, fabric, etc. Substantial range of sub-contractors at command. Keen and proved organiser. Experience includes both sea and land machines.—State salary and particulars, Box No. 3642, The Aeroplane, 166, Piccadilly, W.1.

Position of responsibility wanted. Gentleman, aged 41. British born, medically unfit military service, but energetic and fit for ordinary business. Fourteen years' experience, principally administrative, railway wagon, bridge, and general engineers, England and abroad. Excellent references.—Box No. 3701, The Aeroplane, 166, Piccadilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page II. of cover and Buyers' Guide).

Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264, or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willow brook Company, Leicester.

Nuts! Nuts! Nuts! We specialise on hexagon nuts. Inquiries solicited. — "Carlton" Manufacturing Co., Ltd., Moseley Street, Birmingham.

FOR SALE.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid.—Write for full catalogue, Palmer's Garage, Tooting, S.W.

100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.

Overhand Planer, One Thicknessing Machine, and **Fourcutter** for sale.—Box No. 3658, The Aeroplane, 166, Piccadilly, W.1.

Cane Seats Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.

Airship Seats, completely upholstered or canework only; favourable quotations given and regular deliveries guaranteed.—Frank D. Harrison, Stapleford, Nottingham.

For Sale, 15-20 h.p. motor lorry, good order. Recently overhauled. Price, £150.—Roil Manufacturing Co., 18, Sheen Road, Richmond.

1916 "Omega," 2¾ h.p. Countershaft 2 speed; semi T.T. bars. Splendid condition for service use. £30.—A. Parker, 38, Finsbury Park Road, N.4.

Dieheads: Coventry, C½; "H. and G. 9-16." rotating; 4 BA, 2 BA high-speed dies for above; high-speed cutters (radius) for 4 BA forkend; assorted carbon drills; 3in. chuck.—Inquiries, Box No. 3694, The Aeroplane, 166, Piccadilly, W.1.

TO LET.

Convenient workshop to let in South-Western district to accommodate 30-35 workers, fitted with electric power and light, also gas. Good benches.—Apply, Box No. 3699, The Aeroplane, 166, Piccadilly, W.1.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, The Aeroplane, 166, Piccadilly, W.1.

Engineering Firm with well-equipped machine shops, now engaged on munitions, solicits inquiries for all classes of turning, drilling, grinding, milling, fitting, etc. Aircraft fittings, also copper pipe work, a speciality. Correspondence with a view to post-war business especially invited.—The Lankester Engineering Co., 39, Eden Street, Kingston-on-Thames.

A South London aircraft firm has idle capacity for covering and doping. Very best work and good deliveries. Inspection of work in progress invited.—Write, Box No. 3700, The Aeroplane, 166, Piccadilly, W.1.

London Representation.—We are willi as London representatives for a limite of provincial aircraft manufacturing fi are on the spot and can attend to all and district and Government inquiries nautical Consultants, Ltd., 217, P London, W.1.

Engineers are open to undertake furt tracts at once for aero, marine, and machine work of all descriptions. and prompt deliveries given; Class A Box No. 3688, The Aeroplane, 166, P W.1.

MODELS.

Model Aeroplane, flies ¼ mile circula carriage paid, 3s. 6d. "I can th recommend your machines." Te from Dr. Adams, Union Road, Thousands satisfied, testimonials f parts.—Dept. C., Bristol Model A Depôt, Eastville, Bristol.

T. W. K. Clarke and Co., Ltd., M partment, Hampton Wick.—Though busy with full-size aeroplane parts we still build models as we did in 190 with Biplanes, etc., in Stock.—Send for our illustrated List, 120 items models; certain metal goods are out

ENGINEERING.

British School of Aeronautics. — Engineering Course; Aero Design; A struction; Aero Draughtsmanship; M Engineering. — Pennington's, 254, Road, Manchester.

HAULAGE.

Steam and Petrol Motor Wagons for timber transport.—Apply, Silwood Stor Ltd., 7, Victoria Street, Westminste Telephone, Victoria 6882.

PUBLICATIONS.

6th Revised and Enlarged Edi with "Types of Aeroplanes" down

THE AEROPLANE SPEAK

By Capt. H. Barber, A.F.A Price, 7s. 6d. net.; 8s. post fre McBride Nast & Co., 2, Breams B E.C.

Just published. 360 *pp. with Illustrations,* 4 6¾ *in., limp cloth. Price* 6/- *net (postage,*

The Aviation Pocket Book for

By R. BORLASE MATTHEWS, Assoc. M. Inst. C.E., F.Ae.S.

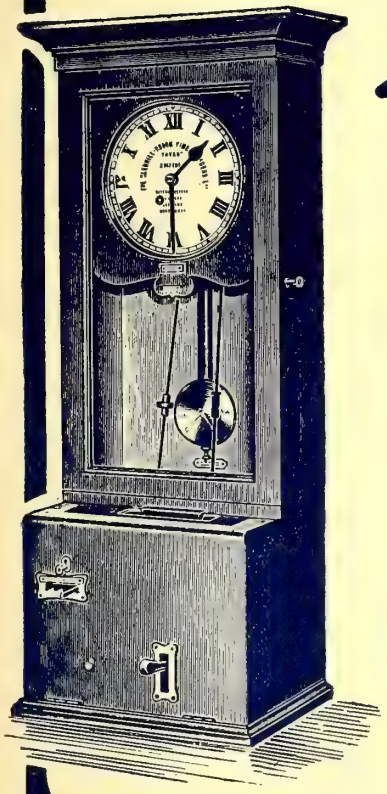
Containing data on Aeroplane Theory and Air Pressure and Resistance, Structural M Engines, Typical Aeroplanes, Piloting, Meteorological Data, Scouting and Signalli etc. With Glossary and other information to all interested in Aviation.

Prospectus on Application.

London: CROSBY LOCKWOOD & 7, Stationers' Hall Court, E.C.



Always up to time



THE TIME STAMPED
ON THE CARD...
ALWAYS AGREES
WITH THE CLOCK

A BRITISH MACHINE
THROUGHOUT.....
ENSURES CORRECT
ESTIMATES.....

THE GLEDHILL-BROOK TIME RECORDERS LTD
26 Victoria St LONDON, S.W. 44 Hill St BIRMINGHAM.
43 MARKET St HUDDERSFIELD.

Contractors to the Admiralty and Air Board.

THE

CENTRAL AIRCRAFT COMPANY

DESIGNERS AND CONSTRUCTORS

OF AIRCRAFT.

Office

KILBURN, N.W.6.

Telegrams: Aviduction, Phone, London.
Telephone: Hampstead 4403, 4404.

CONTRACTORS TO THE ADMIRALTY AND AIR MINISTRY.

SHORT BROTHERS,

ROCHESTER, KENT,

AND

BEDFORD.

Telephone —
627 CHATHAM
261 AND 262 BEDFORD
788 BATTERSEA.

Telegraphic Addresses;
"SEAPLANES," ROCHESTER
"SHORTS," BEDFORD.
"BALLOONING," LONDON.

London Office: WHITEHALL HOUSE, 29/30, CHARING CROSS, S.W. 1.

Telephone: 378 REGENT. *Telegrams*; "TEST PHONE, LONDON."

EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for THE AEROPLANE AND GENERAL PUBLISHING CO., LTD., by BONNER & CO., The Chancery Lane Press, Rolls Passage, London; and Published by THE ROLLS HOUSE PUBLISHING COMPANY, LTD., at Rolls House, Breams Buildings, London.

THE AEROPLANE

Edited by C. Grey

WEDNESDAY. JUNE 26, 1918.

Vol. XIV. No. 26. SIXPENCE WEEKLY [Registered at the G.P.O. as a Newspaper.]

John Dawson and Co. (NEWCASTLE-ON-TYNE), Ltd. Air Craft

Newcastle-on-Tyne.
Telephone ... ... CENTRAL NEWCASTLE 2604.
Telegrams ... "DEPENDABLE, NEWCASTLE."

Southampton House,
High Holborn, W.C. 1.
Telephone ... ... HOLBORN 1876.

Auster LONDON. FOR Aero-shields BIRMINGHAM

BEARDMORE AERO ENGINES

TITANINE
The Original DOPE Non-Poisonous
SEE ADVERT. INSIDE.

WAKEFIELD Castrol MOTOR OIL
"R" (Racing)
THE ONE OIL FOR ALL AERO ENGINES
Immediate delivery to rails guaranteed.
S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONTRACTORS

TELEPHONE: OLDBURY 111. ACCLES & POLLOCK, LIMITED. TELEGRAMS: ACCLES OLDBURY.
Weldless steel tubes for aircraft construction. Tube manipulation and presswork.
SEE ADVERT. INSIDE.

For GOGGLES, WINDSCREENS, OBSERVATION PANELS, Etc.
TRIPLEX SAFETY GLASS
The TRIPLEX SAFETY GLASS CO., Ltd. 1, Aldemarle St., London, W.1.

ALUMINIUM CASTINGS

OF EVERY DESCRIPTION.

We make a Speciality of Aeronautical and Automobile Work.

We are making many thousands of **Aluminium Die Castings** weekly under the celebrated **Cothias** process—in many cases **entirely eliminating** machining operations, and we hold the sole manufacturing rights in the British Empire for this process.

Chemical and Physical tests are made on our own premises, and our **Castings,** both **Sand** and **Die,** are produced under the most up-to-date and scientific methods.

Sole makers of the **Birmal Aluminium Pistons,** thousands of which are running to-day in a highly satisfactory manner under the most severe conditions.

Highest Class Castings to Government Specifications. Prompt Delivery.

BIRMINGHAM ALUMINIUM CASTING (1903) CO., LD.

Cambridge Street, BIRMINGHAM.

Factory and Office Furniture

LARGEST STOCK FOR **IMMEDIATE** DELIVERY (NEW AND SECOND-HAND).

SPECIALITY



THE F.O.F DESK.

SAFES.

COOKE'S (FINSBURY) LTD.

FINSBURY PAVEMENT HOUSE,
LONDON :: :: :: E.C. 2.

Telephones { LONDON WALL { 6179 573

See Telephone Book relating to our Shopfitting, Signs and other Departments

THE "Autoclipse" Dope Can, 7 inches diameter, has been designed to overcome the ject existing in many cans at esent being used. It is econo- cal and clean, and easily fitted. ie contents are always in view.

The Autoclipse
REGISTERED TRADE MARK

FITTED with Bail Handle and palette grip. Improved inclined mouth to allow material to return to vessel. Hollowed internal bottom to enable all the contents to be used.



DOPE CAN
HILLS PROV. PAT. 3918.)

Prevents Waste.
No. AV 10/1.

Supplied with or less aperture for brush handle.

Price:
Type A (plain flap) ... 6s.
,, B (Aperture flap) 6s.
DELIVERY FROM STOCK.



Brown Brothers Ltd
GREAT EASTERN STREET, LONDON, E.C.2.
Telegrams: Imbrowned, Bethroad, London. Telephones 6300 London Wall (14 lines).
BRANCHES AT MANCHESTER, PARIS AND MELBOURNE.

Metal Fittings a Speciality.

The Aero Mechanical Co., Ltd.
CONTRACTORS TO THE AIR BOARD.
60-66, ROCHESTER ROW, LONDON, S.W.1.
Telephone: Vic. 7570 (3 lines).
Managing Directors: E. Salomon, J. Fogelson

Complete Fittings and Dies in Stock for latest D.H. Machines; also most of the Fittings for other D.H. Machines and Handley-Page.

Our reputation has been built up by our ability to effect deliveries right up to time.

GOVERNMENT CONTROLLED ESTABLISHMEN
UNDER THE MUNITIONS OF WAR ACT.

ADAM, GRIMALDI & Co, LTD.

AIRCRAFT MANUFACTURERS
CONTRACTORS TO H.M. GOVERNMENT

OFFICES: GLASSHOUSE STREET,
ALBERT EMBANKMENT, VAUXHALL, S.E. 11
Telegrams; "Autocoach, 'Phone, London." Telephone: Hop 5552 (3 lines)

Telephone:—1992 HAMMERSMITH (3 lines).

The DAVIDSON Aviation Co Ltd

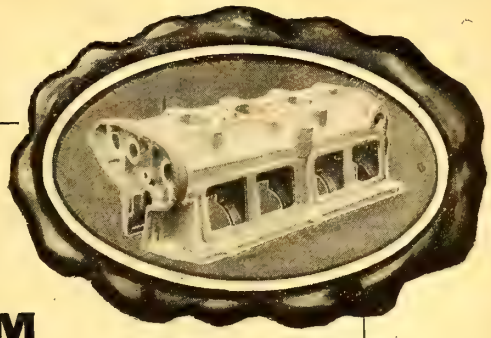
CONTRACTORS TO H.M. GOVERNMENT.
Designers and Manufacturers of all Types
of Aircraft for Overland and Oversea
Purposes, Flying Boa s, etc.

Managing Director:
W. EWART CHESTER, F.R.G.S.

Consulting Engineer:
H. B. MOLESWORTH, M.I.C.E.

229-231, Hammersmith Road, W.

Sterling



ALUMINIUM CASTINGS.

1. High Tensile Strength. Thoroughly sound.
2. Uniform in analysis, strength and weight.
3. Highly finished and accurate — machine moulded up to largest sizes.
4. Exceptional daily output per pattern.

AIRCRAFT AND MOTOR ENGINE CYLINDERS, CRANKCASES, PISTONS, Etc.

We also make cylinders and pistons in STERLING IRON; castings in phosphor and 5 ton manganese bronze.

Sterling Metals, Ltd: Coventry.

WIRE: "STERMET" COVENTRY
PHONE: COVENTRY 881

Moulds.

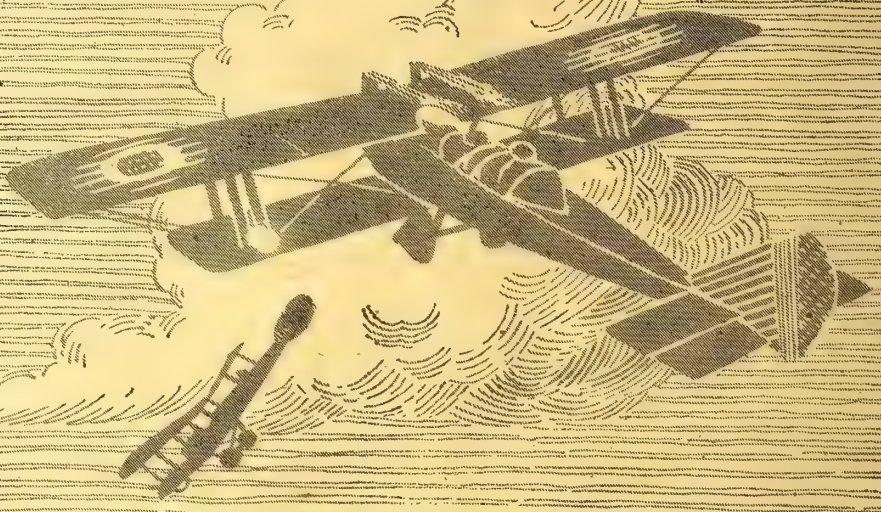
HANDLEY PAGE LTD.

CONTRACTORS TO THE ADMIRALTY AND WAR OFFICE

CRICKLEWOOD, LONDON. N.W.2.

HAMPSTEAD 7500 (9 lines).

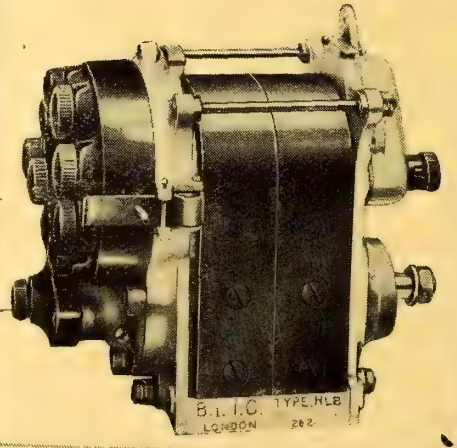
"HYDROPHID, CRICKLE," LONDON



THE HEART OF THE AEROPLANE—the vital centre of its power unit—is undoubtedly the magneto. Failure there mu t be unthinkable! That is why the "B.L.I.C." Magneto is supreme—its absolute reliability may be taken for granted!

B·L·I·C

THE BRITISH LIGHTING & IGNITION Co Ltd



THE BRITISH LIGHTING AND IGNITION Co., Ld

204, Tottenham Court Road, London, W.1
Proprietors: VICKERS Ld.

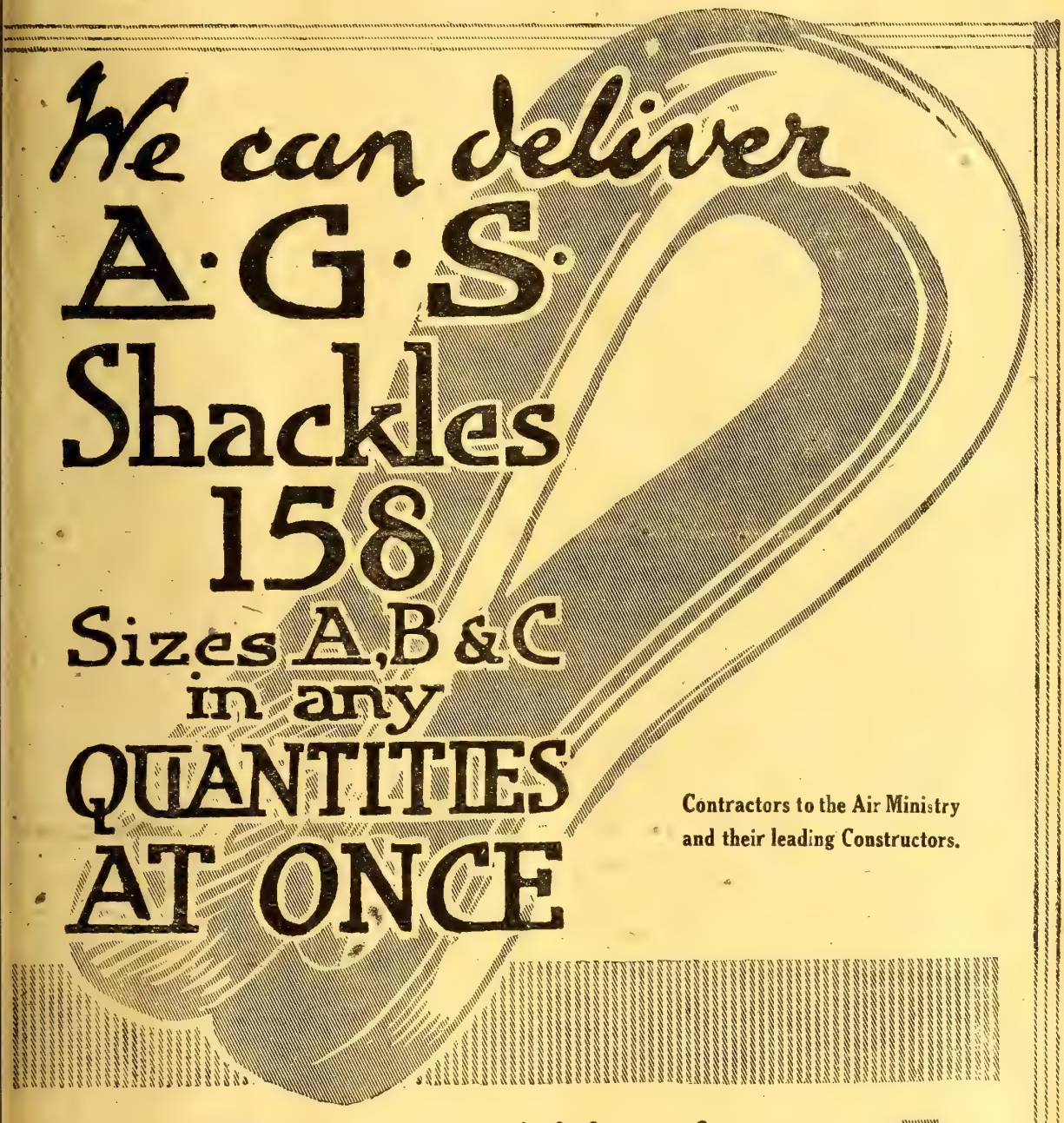
TELEGRAMS :: :: :: DEPENDABLE, NEWCASTLE ON-TYNE.
PHONES :: :: :: 2604 CENTRAL (5 LINES).

JOHN DAWSON
AND COMPANY
(NEWCASTLE-ON-TYNE),
LIMITED.

AIRCRAFTSMEN

NEWCASTLE-ON-TYNE.


WHITEHEAD
AIRCRAFT
RICHMOND
SURRE



We can deliver
A·G·S·
Shackles
158
Sizes A, B & C
in any
QUANTITIES
AT ONCE

Contractors to the Air Ministry
and their leading Constructors.

The Actual Manufacterers
The British Gold Shell
Ring Co., Ltd.,
Hounslow, Middlesex

Telegraphic Address
"GOLSHEL, HOUNSLOW"

Telephone Address
HOUNSLOW 254.

GNÔME & LE RHONE ENGINE COMPANY

Contractors to the

War Office and Admiralty

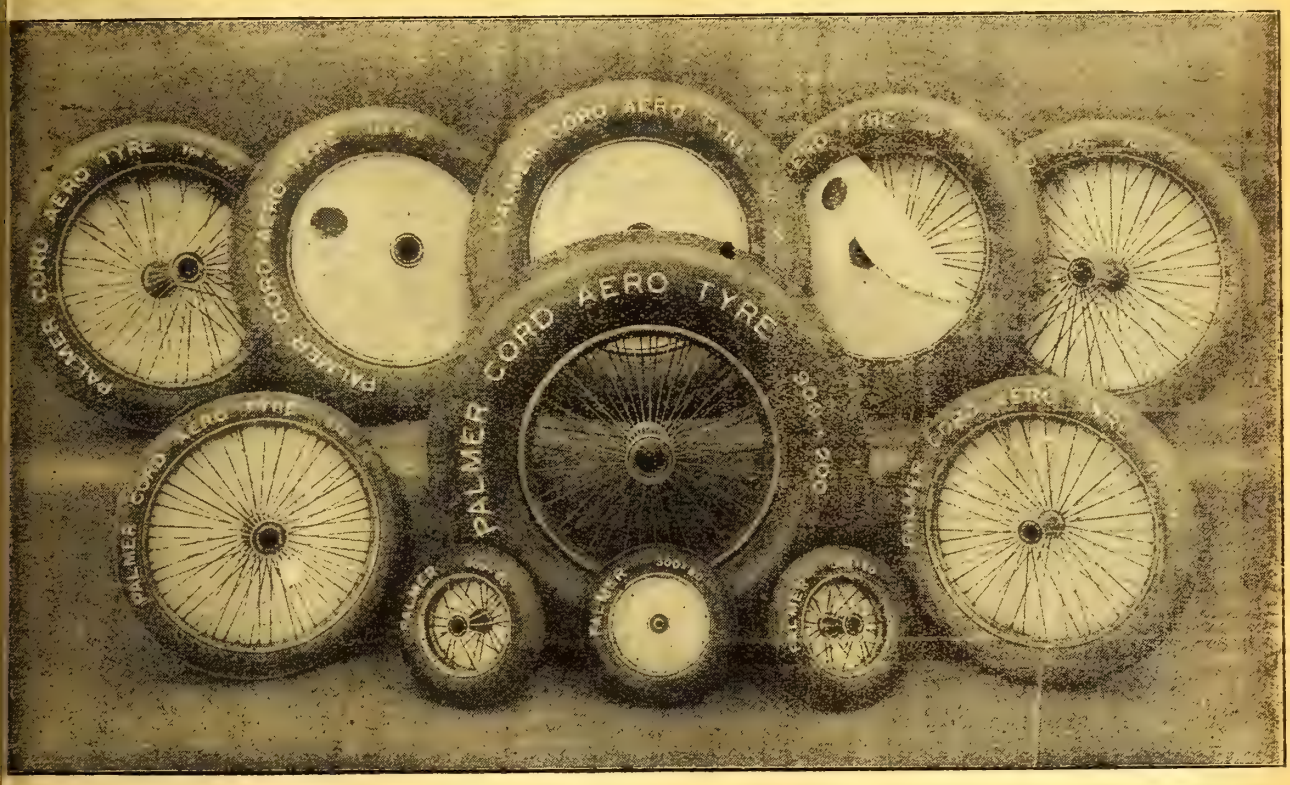
London Offices:

27, BUCKINGHAM GATE, S.W.1., and THE HYDE, HENDON, N.W.9.

Blackhorse Lane, Walthamstow.

PALMER

LANDING WHEELS & TYRES



STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line	Tyre Sizes	Wheel No.	Hub Length	Hub Bore	Track Line
		m/m	m m	m m			m/m	m m	m m			m/m	m/m	m/m
600×60	16	111.12	25.4	Central	700×100	33	150.	38.09	Central	800×150	†41	185.	55.	Central
,,	17	72.39	12.7	Central	,,	77	178.	44.45	132/46	,,	82	185.	55.	135/50
650×60	30	89.	31.75	Central	,,	92	185.	55.	135/50	,,	85	185.	55.	Central
675×60	21	160.	28.	Central	,,	95	185.	55.	Central	,,	106	185.	47.62	135/50
,,	34	150.	31.75	104/46	,,	96	178.	55.	132/46	,,	†205	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	99	178.	38.89	132/46	1000×150	97	250.	65.4	Central
650×65	78	178.	44.45	132/46	,,	112	150.	40.	Central	,,	102	185.	55.	125/60
,,	79	178.	44.45	Central	650×125	119	178.	55.	132/46	,,	201	185.	60.32	125/60
,,	100	178.	38.09	132/46	750×125	33	150.	38.09	Central	900×200	107	185.	55.	Central
,,	101	178.	31.75	132/46	,,	77	178.	44.45	132/46	,,	108	185.	55.	125/60
600×75	21	160.	28.	Central	,,	92	185.	55.	135/50	,,	120	185.	66.67	125/60
,,	34	150.	31.75	104/46	,,	95	185.	55.	Central	,,	202	185.	60.32	Central
,,	111	150.	38.09	104/46	,,	96	178.	55.	132/46	,,	208	185.	60.32	125/60
700×75	78	178.	44.45	132/46	,,	99	178.	38.89	132/46	1100×200	52	185.	55.	116/69
,,	79	178.	44.45	Central	,,	112	150.	40.	Central	,,	57	185.	55.	Central
,,	100	178.	38.09	132/46	800×150	†36	185.	55.	135/50	,,	203	185.	60.32	116/69
,,	101	178.	31.75	132/46	,,	†40	185.	60.32	135/50	,,	204	185.	60.32	Central

†*Wheels Nos.* 36, 40 41, *and* 205 *are of stronger type than the other wheels for* 800 x 150 *tyres.*

THE PALMER TYRE LIMITED

Contractors to the Admiralty, the War Office, and the Ministry of Munitions.

119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." Telephone: GERRARD 1214 (Five lines).

PARIS: 24, Boulevard de Villiers, Levallois-Perret.



AVRO

AEROPLANES
AND
PARTS.

A. V. ROE & Co., Ltd.,
NEWTON HEATH,
MANCHESTER.
Telephones: City 8530 & 8531.
Telegrams: Triplane.

SOUTHAMPTON.
Telephone: Hamble 18.
Telegrams: Roe, Hamble.

166, Piccadilly,
LONDON, W. 1.
Telephone: Gerrard 3186.
Telegrams: Senalpirt, Phone.
Code: A.B.C., 5th Edition

GEOFFREY WATSON. 1918

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

The AEROPLANE

The Editorial and Advertising Offices of "The Aeroplane" are at 166, Piccadilly, London W.1.
Telegraphic Address: "Aileron, London." Telephone: Mayfair, 5407.
Accounts, and all correspondence relating thereto, should be sent to the Registered Offices of
The Aeroplane and General Publishing Co., Ltd., Rolls House, Breams Buildings, E.C.4.
Subscription Rates, post free: Home, 3 months, 7s. 6d.; 6 months, 15s.; 12 months, 30s.
Foreign, 3 months, 8s. 9d.; 6 months, 17s. 6d.; 12 months, 35s. Canada, Year, $8.
U.S.A., 1 Year, $8.50c.

ON SEVEN YEARS' WORK.

With this issue THE AEROPLANE completes its four-eenth half-yearly volume, and so its seventh official ear of issue, though actually its first number ppeared at the beginning of June, 1911. Somehow it as managed to stagger through another year of xistence in spite of difficulties, such as paper shortage, inimisation of staff, and difficulties with D.O.R.A.

Yet, if one may judge by the ever-increasing mass f daily correspondence and the variety of questions hich one has to answer, all concerned in one way or nother with winning the war, though not in the least oncerned with the regular work of running THE AERO-LANE newspaper, one feels justified in believing that ie paper is helping the R.A.F. and the Aircraft In-ustry in its own way, if not in any officially recognised ay.

A MIXED BAG.

For instance, to take at random one morning's post st week, the letters included a request from an Ameri-n newspaper syndicate for a propagandist article on merican aviators in aerial warfare; an inquiry from firm of blast-furnace proprietors for information as maximum speeds for air-screws for aeroplanes—a rious combination; an inquiry from a firm of organ-uilders for information as to the best way of getting touch with the right people to place orders with em for aeroplane parts; an inquiry from an anti-rcraft gunnery officer for charts of enemy aircraft; inquiry from a mechanic in an aircraft factory who anted to know how to join the R.A.F.; a request from Government Department for information concerning ie character of one who had applied for a berth in at Department; a request from a Government Com-ittee for a copy of a lecture which one wrote a year so ago for another Government Committee; a request om a firm of accountants, on the suggestion of an fficial of another Department, that one would advise em as to how to find a competent valuer for the ock of an aircraft factory; an inquiry from an in-entor as to what is really wanted in the way of level dicators; and sundry other equally diverse and varied quests and inquiries, none of which had anything to with THE AEROPLANE as a newspaper, and all of hich required special knowledge of a separate subject.

Naturally one takes such implicit faith in one's omni-ience as a compliment. Where, as frequently, one is norant of the special subject, one takes immediate eps to obtain accurate information and transmit it desired—always provided, of course, that the inquirer entitled to receive it. And in answering such in-uiries one feels that one is helping to win the war at ast as much as if one were a special constable direct-g fair damsels where to find the latest matinée idol, directing belated revellers to their homes, or shep-erding unsavoury aliens in a tube station.

DANGEROUS CURIOSITY.

Frequently it occurs that inquiries are such as cannot properly be answered. There is, for example, the ardent student of aviation who sends a sketch of a strange machine which he has seen in his neighbourhood and wants to know what it is and all about it. Sometimes it so happens that such inquiries hit on the very latest "hush-hush" machines, which ought rightly to be kept in a locked shed, so all one can do in such cases is to warn the inquirers against infringing D.O.R.A. by seeking to elicit information concerning munitions of war, to wit aircraft.

It is quite surprising how many inquiries of this nature come in, ranging all the way from a question such as the instance mentioned to an inquiry as to what officer is commanding such and such a force of the R.A.F. Therefore one has to be fairly watchful as to what information not to give, as well as watchful as to what should be given in the interests of the R.A.F. and of aircraft production.

STRENUOUS TIMES.

Being thus a free gratis general enquiry office entails quite an amount of work on a staff consisting of two "Grade III" men, quite apart from the fact that THE AEROPLANE itself has grown considerably in size of late.

It may be of interest to record that just before the outbreak of war the editorial staff of this paper consisted of six male members, and produced a paper with from 14 to 18 pages of reading matter. To-day the male editorial staff is two in number—the present writer and one assistant—and produces a paper varying between 24 and 28 pages of reading matter.

The work, naturally, is somewhat strenuous. Ordinary office hours are fairly well occupied by what one might reasonably call voluntary work of some national importance, seeing that it is concerned with helping the R.A.F. and with aircraft production, and not with the routine work of the paper, for besides answering inquiries by post, such as those mentioned, there are innumerable callers to be interviewed and telephone calls to be answered. The result is that the ordinary editorial work has mostly to be done in what is called by the average business man "one's own time." One desires here to place on record one's appreciation of the way in which the other half of the editorial staff has done his duty by giving up his own time to the work of the paper, and to other work for the good of aviation, such as helping in the editing and compilation of various educative books in which one has been concerned, and in writing propagandist articles for various publications.

Also one wishes to acknowledge the loyal and hard work done by the feminine members of the staff and the keen interest which they take in their respective departments of the paper.

The Doubtful Future.

Whether it will be possible to continue for another year, or for the duration of the war, under similar conditions, is on the knees of the gods, or perhaps one should say in the hands of the Ministry of National Service. It is being more and more impressed on the people of this country by the Government that the Army needs men. Therefore quite conceivably it may happen that either half, or both halves, of the staff of The Aeroplane may be roped into the Army to wash dishes or to become batmen for any of the happily fit and able-bodied young men whom they have helped towards obtaining the King's Commission.

Technical papers concerned exclusively with promoting the production of munitions of war have no prescriptive right to special consideration as compared with luxury papers or humorous papers of any grade, therefore it rests with various people who are not concerned with technical affairs to decide who shall or who shall not be considered to be doing work of national importance and what shall be considered work of national importance. When washing dishes in the Army is considered to be of greater national importance than purveying technical information for the good of the R.A.F. and of the Aircraft Industry, presumably one will go and wash dishes.

Solid Satisfaction.

When that time comes one will at any rate have the satisfaction of looking back on some ten years well spent entirely in working for the cause of aviation, or, as our French confrères call it more picturesquely, "the Conquest of the Air," and for seven out of those ten years this paper, The Aeroplane, can claim to have led the way in every agitation for progress and reform.

Thanks to the foresight and wisdom of those from whom one has drawn one's inspirations, it has always come about in the end that the steps advocated in this paper have eventually been taken, whether they have been concerned with purely technical affairs or with matters of policy.

The I.A.F.

The latest of all examples is the casual disclosure by the Air Ministry in a Communiqué of the existence of the Independent Air Force, R.A.F. It seems only the other day, though actually it was early in 1916, when this paper, along with sundry enthusiasts—or fanatics, call them which you will—in the Flying Services and out, was advocating strongly, in season and out of season, the creation of a striking force specially organised for the aerial invasion of Germany.

We advocated that it should be entirely separate from the R.N.A.S. and R.F.C., so that the air work of the Navy should be done by the Navy, and so that Army Reconnaissance and all that it entails should be done by the Army.

The Force of the Future.

We wrote and spoke of it for convenience as the Imperial Air Service. From Imperial Air Service to Imperial Air Force is not a long step. Nor is it much further from Independent Air Force to Imperial Air Force, in name. And from the position of the I.A.S. which we all advocated then to the position of the I.A.F. which exists to-day appears to be no step at all.

One believes that in this I.A.F. even more than in the parent R.A.F. one sees the beginning of the great defensive and offensive force which will be the safety of this country in the future. If one has only toiled seven years for the R.A.F. Leah, it isn't half a bad-looking Leah after all, and one is quite prepared, if one is allowed to do so, to toil for another seven years for the Imperial Air Force Rachel.

A Great Privilege.

One has been privileged to see the beginning of the three greatest means of human locomotion, the bicycle, the motor-car, and the aeroplane. Still greater has been the privilege of seeing the development of the aeroplane from its earliest feeble efforts to the great aerial locomotion of to-day, and of being right on the inside of every movement in that development.

But the greatest personal satisfaction of all is that of having been concerned with the first attempts at Naval and Military aviation at Eastchurch, Farnborough, and Lark Hill, in 1909-10, and thereafter of having been privileged, by the kindness of the Air Board, not then become the Air Ministry, to spend one glorious week in France in 1917, watching from almost every point of view—G.H.Q., Brigade Staffs, depôts, and aerodromes—the operations of that splendid war machine, the Royal Flying Corps, which had just then attained to that definite superiority over the enemy which it has since held so gallantly, and which one hopes it will always hold. One felt then that, however humble one's efforts had been to help the Flying Services, they had not been wasted, and that they were appreciated by those most concerned.

However long or however short a time The Aeroplane may continue to exist, one is determined that so long as it does exist its whole aim and object will be, as it has always been, to aid to the utmost ability of its staff the work of the King's Flying Services.

C. G. G.

ON FIRE IN THE AIR.

For some unexplained reason, possibly due to the increase of public interest in aviation generally, aided by the fact that tens of thousands of people in this country have intimate friends and relatives in the R.A.F., where, before the war, only tens of people were casually acquainted with those strange beings who flew, there seems to have arisen lately something approaching general anxiety concerning the number of fires which occur in aeroplanes both at home and on active service. Probably the proportion of fires which occur to-day are fewer in proportion to the miles flown than before the war, even if one includes those caused by incendiary bullets or by punctured tanks set on fire by the engine on active service. Nevertheless the mileage is so immense that the total number of men killed by fires in the air is large enough to make the subject worthy of very serious attention by those in authority.

So great is the interest taken in this subject by even such extremely ignorant people as the editors of daily papers that whole articles on fire in the air have appeared in the non-technical Press. One naturally finds references to machines being shot down in flames in all books written by flying officers. Also in books by ordinary civilian visitors to the battle-fields one finds notes on these fires. One recalls particularly, if one remembers rightly in Mr. Jeffery Farnol's graphic description of his visit to an R.F.C. aerodrome, a casual

remark quoted as having been made by an R.F.C. officer, who said, apropos of the crews of machines which had been on fire: "They generally jump overboard before the fire reaches them." Also in a recent issue of an illustrated paper there was a terrifying sketch of a pilot standing on the wing of a blazing machine, controlling it with one hand inside the fuselage, as described in a story from the front published a week or so earlier. And practically ever since the beginning of the war there has been story upon story of the heroism of the pilots of burning aeroplanes.

The Results of Publicity.

The net result of all these stories is twofold. For one thing they foster the idea that fires in aeroplanes are part of the regular risk, if not of the regular experience, of everybody who flies. This idea, if allowed to spread unchecked, is likely to have an evil effect on the supply of pilots for the R.A.F., for many a brave man who would cheerfully face any of the horrors of war on the ground might well funk the prospect of being burnt to death thousands of feet up in the air with no prospect of escape, other than jumping overboard and being smashed on the ground. The prospect is distinctly worse than that of having to meet German *flammenwerfer,* which, at any rate, can be avoided by dodging or retreating or by shooting the user.

A secondary result in some minds, especially in the minds of technical gentlemen who do not fly themselves, is that fires are more or less inevitable, and so must be regarded as a risk to be taken with equanimity—by somebody else. Familiarity breeds contempt, especially among those whose familiarity is second-hand.

It seems eminently desirable, therefore, to set down definitely the statement that fires in the air can be prevented, and that the risk of an aeroplane catching fire should be no greater than the risk of a railway train catching fire, and rather less than similar risks in a motor-car or a steamship.

Causes of Fire at Home.

The causes of fire are many, even when not flying in the face of the enemy, and as the causes are discovered they are cured. One may mention, merely as an instance, one cause which resulted in several deaths in this country. A certain engine in a certain machine caused vibration which broke the petrol pipe close off at the carburettor connection. The petrol poured out through the broken pipe under pressure into the space below and flooded the body of the machine, and when the supply in the carburettor was exhausted the resulting weak mixture "popped back"—as the motorist's phrase has it—into the carburettor and set light to the mass of escaped petrol, which by then was sufficient to burn up the front of the machine and set the main tank alight.

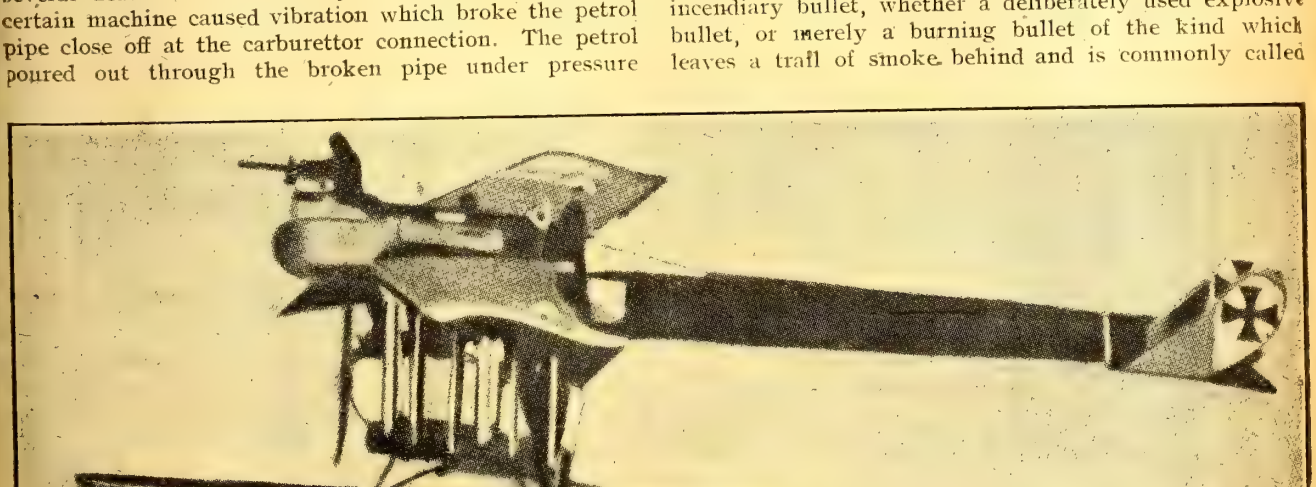
The trouble was cured very simply by cutting the petrol pipes of machines of this type and joining the cut ends by a piece of petrol-proof rubber piping, which was not affected by the vibration. Instructions were sent out accordingly to all squadrons using these machines, but still fires and consequent deaths occurred. When the matter was traced down it was found that the machines in which the later fires happened had not been altered, either because the instructions had not been received or because they had not been carried out.

Other fires have happened, especially in rotary-engined machines, through new pilots switching off the ignition and forgetting to turn off the petrol, so that the engine, continuing to revolve during a descent, has sucked in liquid petrol and thrown it out again all over the front of the machine, with the result that when they have switched on again the machine has caught fire. In most of such cases the fire would die out in a few seconds if the pilot would turn off his petrol as soon as the fire started, but frequently the pilot has lost his head and forgotten to do so, with the result that the petrol-connection has been burnt through and the fire has been fed by petrol constantly poured into it from the burnt-off pipe.

One could mention many similar cases in which machines have been burnt in the air from various causes, frequently through the pilot's own stupidity or through his refusing to obey the instructions given to him on taking over a new type of machine or engine. But even such stupidity or wilful carelessness does not justify anyone in exposing a pilot, still less an entirely unresponsible passenger, to avoidable risks of fire.

Fire on Active Service.

Fires on active service are generally caused by incendiary bullets, or through bullets perforating tanks or breaking petrol connections and releasing petrol which catches fire from the engine. As a rule, an incendiary bullet, whether a deliberately used explosive bullet, or merely a burning bullet of the kind which leaves a trail of smoke behind and is commonly called



WAS IST DAS?—A German nightmare seaplane, designed, apparently, to be offensive to the vision as well as to the enemy. The tractor airscrew can be seen in the front of the small nacelle underneath the gunner's perch. The machine is believed to be called the "Ursinus," possibly because it was built by the motor firm of that name, and is said to have been designed by the Editor of "Flugsport."

a "tracer," does not set fire to a petrol tank if it hits it direct.

If a tracer penetrates a solid mass of petrol it is simply drowned. What generally happens is that several bullets puncture the tank and the petrol is squirted out all over the inside of the machine by the pressure which exists inside the tank for the purpose of forcing the petrol up to the carburettor or gravity tank as the case may be. This petrol mingling with the air forms an inflammable mixture which is set on fire by the next tracer which comes along, or even by a spark from the magneto, or by a short-circuit from a broken ignition wire, or by a flame through a bullet-hole in the exhaust-pipe, or any one of a dozen other causes.

Anyhow, whatever the causes of the fire, the results are the same. Someone is "shot down in flames," and one has no hesitation in saying that the ever-present idea of being shot down in flames is the greatest strain which the nerves of active-service pilots have to bear. The prospects of being shot dead, or of being badly wounded and crashed, or even of being shot down out of control, are, according to experienced pilots, nothing like so bad as the prospect of fire.

The *moral* of the R.A.F. is immensely high, thanks to the superiority which the fighting pilots have won over the enemy's fighting pilots. Our bombing and reconnaissance pilots naturally participate in this high *moral*, for, however much they may be harassed in their work by anti-aircraft guns and enemy fighters, they know that the enemy's bombers and reconnaissance people are still worse harassed by our fighters. Nevertheless, it is beyond dispute true that if immunity against fire could be assured, or even if a reasonable chance of escape from fire, after it had broken out, could be guaranteed, active-service pilots of all classes would be far happier at their work.

Not only would many lives be saved, but the relief from the ever-present idea of fire would so relieve nerve-strain that men would be able to stand much longer periods of active-service flying before it became necessary to send them home for a rest. No matter how brave a man may be, nor how reckless he may be in a fight, that idea of fire is always present at the back of his brain, and the mere mental work of watching for signs of an outbreak, and keeping in mind what is the right thing to do immediately it shows, puts extra work on his nerves which would add materially to his value if it were removed. And, let it be here repeated, the risk of fire, and the consequent nerve-strain and the brain-fag, can be removed if only the subject of fire in the air is tackled really energetically by the right people.

The Desired End.

The means by which dangers from fire may be removed must naturally be discussed with caution, for one does not want the enemy to get ahead of us in this most important matter.

So far as the R.A.F. is concerned, one believes that all our aviators would be almost as glad to see the dangers of fire removed from the enemy as from our own people. Though one has talked over the subject with very many of our best fighting pilots, one cannot recall a single one who did not honestly hate setting an enemy machine on fire.

Shooting a man down is all in the day's work. The odds are even, more or less, which combatant scores. Putting a clean bullet-hole through an enemy naturally does not trouble a fighting man any more than giving an opponent a black eye troubles a boxer. Either would shake hands and help his opponent to the nearest doctor after the fight was over. But setting a ma alight seems to be another matter. The spirit whic prompts this feeling of aversion may be found quit clearly expressed in their respective books by suc widely diverse characters as the late Captain vo Richthofen and the late Captain Ball.

Nevertheless, it is necessary that the R.A.F. shoul be made safe against fire before the Germans attai to that same desirable end. Therefore one can bu recall what has already appeared in print on the sub ject, and refer to what the Germans are known to b doing in this direction.

The Means to the End.

The first and most obvious cure for fire is to use fuel which will not ignite till it is required to do so Years ago, long before the war, one advocated strongl the study of the possibility of producing an engine t burn crude oil, such as a Diesel engine used. Th difficulties are many, and one recalls that at that tim Mr. Howard Wright suggested, only half-jokingly taking our leading aero-engine designer, our leadin Diesel expert, and our leading metallurgist, and lock ing them up together till they produced what wa wanted, namely a very light engine using very heav oil. The method of propagation antedates the much advertised production of the designs of the "Liberty engine, and one feels sure that the results would b not less satisfactory in the case advocated.

Many people are convinced that such an engine i possible if only there is sufficient demand for it an if only sufficient money is available for experiment To-day the demand exists and the money is available It is for the Air Ministry to say whether such exper ments shall be pursued. One knows already of a ga producer plant, using common coke, which can be fitte to an ordinary motor-car, so there seems a distinc possibility for an oil-gas plant for use on aeroplanes.

Be it noted particularly, also, that such an engin would not only prevent fires in the air, but woul practically make it impossible for fires to occur throug crashes on the ground, a form of fire which probabl costs as many lives as does fire in the air—apart, pe haps, from fires caused by incendiary bullets.

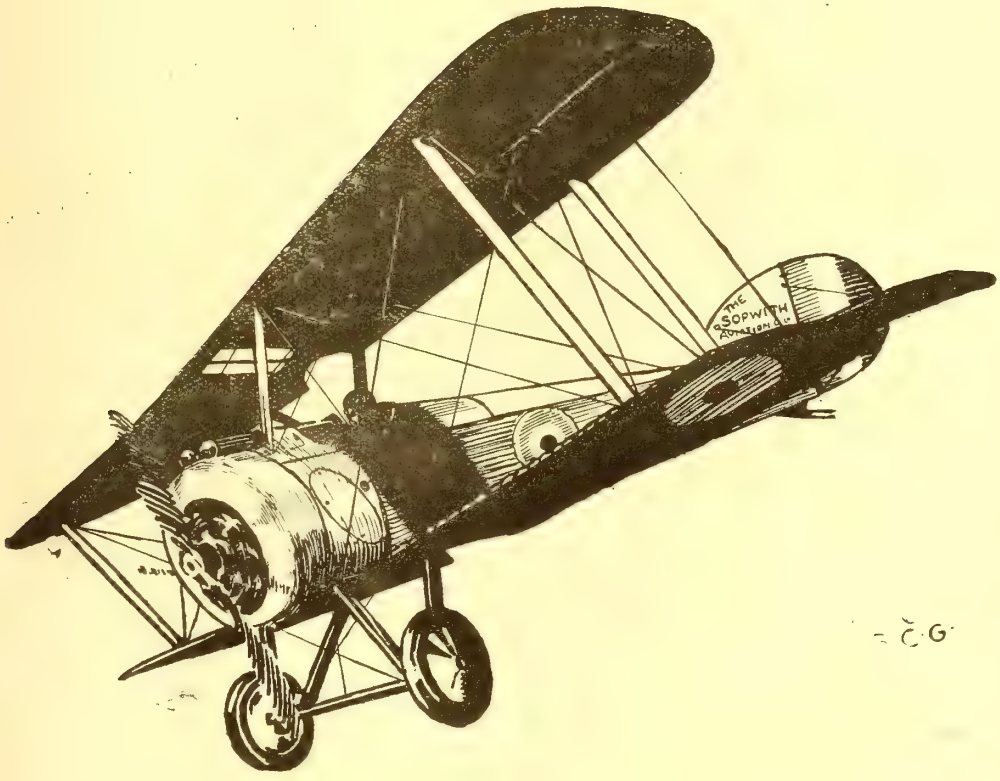
Armoured Tanks.

Until petrol can be abolished, the most obvious an simple preventive of fire from incendiary bullets is a armoured tank. The Germans have tried not onl armoured tanks but armoured machines. The earlie people of the R.F.C. will remember their old frien "Copper-Belly" of the Ypres Salient in 1915, and on gathers that of late the Germans have been usin special armoured machines for "ground-strafing. One recalls, also, M. Blériot's effort of 1914, in whic the engine, tanks, and pilot sat in an armoured bath to which was bolted a three-ply tube for a fuselage with the whole tail-unit bolted onto that. It faile because of the engines of the period, but things hav changed since that day.

The equally obvious disadvantage of armoured tank or armoured machines is their weight. Hitherto i has been argued that the advantages of extra speed an climb more than outweigh the risk of fire. One suggests however, that the far lighter and more powerful engine now available more than compensate for the extr weight of an armoured tank.

Even if the result is a reduced "ceiling"—or limit ing height of climb—the advantage remains. There i no particular object in having a ceiling at 20,000 fee if there are no machines to fight when one gets there or if, when one descends to the fighting level of, say

THE SOPWITH



AVIATION COMPANY, LIMITED

KINGSTON-ON-THAMES, ENGLAND.

CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines).
Telegrams: SOPWITH, KINGSTON.

SBAC — THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

Paris Office:
21, RUE DU MONT THABOR.

15,000, or even 10,000, feet, one finds oneself opposed to enemy machines which, owing to their armour, are almost invulnerable.

One still regards the armoured petrol-tank as a makeshift, and "non-inflammable" fuel as the true solution of the problem. But for the purposes of the present war one believes that the Germans are, not for the first time, on the right track.

Freak Ideas.

Naturally the wild untamed inventor comes along with all kinds of freak ideas to abolish the fire danger, of which he has read in the daily news-sheets for the first time within the last few days or weeks. There is the crank who has a lovely idea for jettisoning his whole tank as soon as it catches fire. He quite forgets that such a device means redesigning the whole fuselage of the machine, and possibly the wings and undercarriage as well.

Evidently he never came across an ancient notion put forward years ago in this paper for night-flying machines, to enable them to descend in the dark without risk of fire and with the minimum of damage. It was simply a ripping-panel in the tank, which was designed to open out like a sardine-tin on pulling a lever, so that all the petrol would fall out in a second or two and leave the machine dead light, so that it could glide slowly and damage the pilot as little as possible if it hit any obstruction in the dark. The idea originated with the late Mr. Harold Barnwell, somewhere in 1915, if one remembers aright.

Also, the detachable tank gentleman forgets that the bullet which set the tank on fire, or some of its predecessors, would probably hit and jamb the levers or cranks or slides or whatever other arrangements he proposed to use in jettisoning his tank. Or they might hit the quick-release gear and let the tank go just when he wanted it most.

Then there is the equally ingenious gentleman who wants to make his tank into a kind of Thermos flask, arguing that if escaping petrol escapes into a vacuum it will have no air to burn with it. He conveniently forgets that bullet-holes might conceivably spoil his vacuum. And he probably does not know that it is not the bullet going in which makes the big hole, but the bullet going out on the other side, which takes a chunk of metal with it.

The number of people who want to put aeroplane tanks into bullet-proof waistcoats—such as were widely advertised some time ago, till the front-line troops found that they were not worth their weight—is legion. And there are heaps of freak notions of other sorts.

Some few really promising ideas have turned up, and one hopes that experiments with them are being encouraged, because even if they prevented a quarter or a fifth of the fires which happen they would justify their existence. Still one believes that, for the immediate present, the plain common-sense armoured tank of the Germans is the soundest notion of all.

The Emergency Exit.

Meantime, pending the production of the fire-proof engine and the bullet-proof tank, one advocates most strongly the close, and very quick, study of the parachute question.

Beyond all question the next best thing to prevention is cure. And if we cannot guarantee to our aviators that their machines will never catch fire, the very least we can do is to provide them with a means by which they can get out and walk when the fire starts.

The ordinary superior engineer person associates parachutes with balloons and trapeze artists at country fairs. He will not realise even now, with all the lessons of our Kite Balloon and Airship people before his eyes, that the designing of a parachute is an exact science and that its stowage is a high art. The scientifically designed and artfully packed parachute of to-day is no more like the open-mouthed umbrella of the country fair than the latest fighting aeroplane is like a 1909 box-kite.

Moreover, the whole design of the modern aeroplane has developed of its own accord in such a way that it actually provides without any alteration a volume of waste space which is simply gaping to receive a parachute.

Parachute descents, with old-fashioned parachutes, were made from aeroplanes a couple of years before the war, so there is nothing new in the mere descent. That gallant little sportsman, the late lamented M. Pégoud, descended by parachute from a single-seated Blériot some time before he looped the loop. Yet here we are, after almost four years of war, with every pilot looping all day long as part of his daily job, and still we do not provide our pilots with a life-saving apparatus which is at least as certain and very nearly as simple as a life-buoy on board ship. Certainly it looks as if lives were cheaper than brains in the estimation of some Government departments.

At this time of day every aeroplane should be provided with an emergency exit, as regularly as is every theatre.

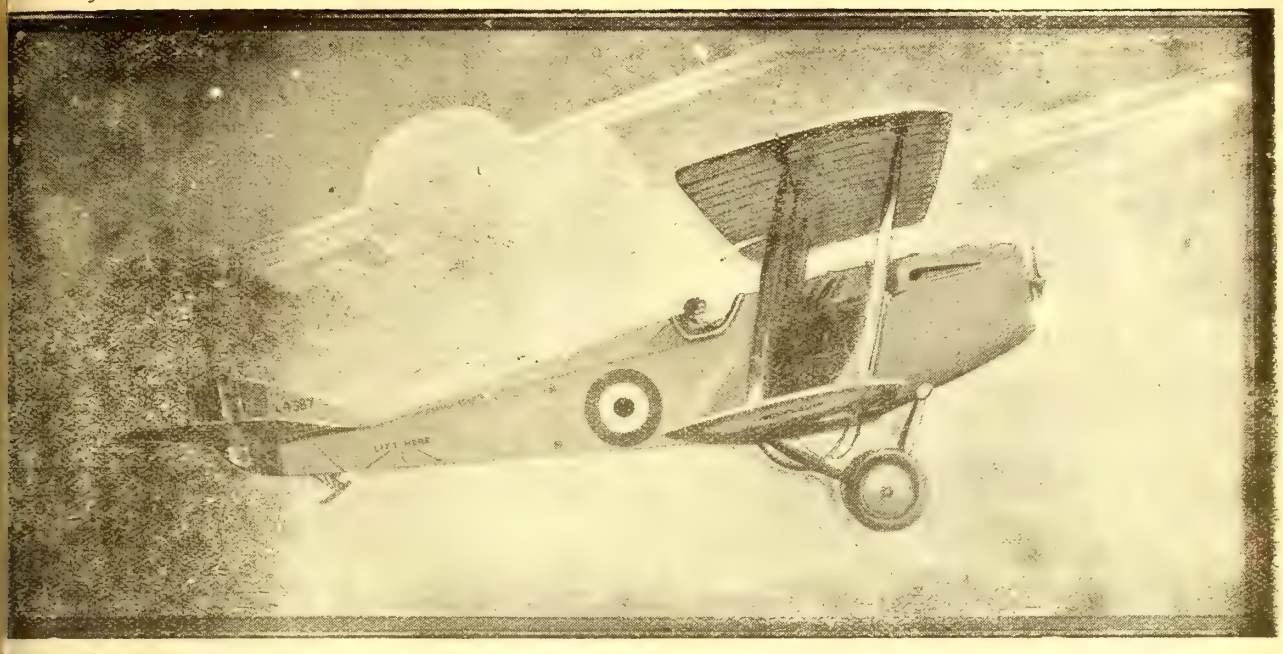
An Additional Safeguard.

One does not, as do some misguided converts, regard a parachute as a guarantee of eternal life. It is no use in a crash in getting off or in landing, such as cause the majority of deaths in training. Nor is it any use in a spin near the ground. But it does give its owner a sporting chance if anything goes wrong at a reasonable height.

For example, one has heard of tails breaking at a height of several thousands of feet and causing a fatal crash several minutes afterwards, owing to a machine coming down in a slow spin or in a series of alternate dives and stalls. Also, one has heard of control-wires breaking at home, or being shot away on active service, and of many other accidents which have ended fatally after quite a long descent. In practically every one of those accidents the pilot, and passenger if any, could have been saved by a parachute.

And, as already stated, in practically every case of fire in an aeroplane there would be plenty of time for the crew to abandon ship by means of a parachute long before the fire could prevent the departure. The whole operation can be made automatic, so that even a badly wounded man, who feels himself losing control of his machine, can, with his last conscious act, release himself from the aeroplane and descend unconscious, but with a fair chance of safety, by parachute, instead of lying in his machine to be crashed when it hits the ground.

One feels certain, as the result of many discussions on this subject, that, next to complete immunity from fire, an automatic parachute would be the best saver of nerves, and one states unhesitatingly that, even if the fireproof engine existed, the parachute should also be fitted as a safeguard against breakages in the aeroplane itself, and as a last resort for a badly wounded man who can no longer control his machine. The whole question is therefore commended to the earnest attention of those who have the best interests of our aviators at heart.—C. G. G.



The latest Martinsyde Fighter, fitted with a Rolls-Royce Engine, holds the World's Records for

CLIMB
and
SPEED at HEIGHT



MARTINSYDE

Head Office

WOKING, Surrey.

A PEERAGE FOR THE AIR MINISTER.

It was announced on June 19th that the King has been graciously pleased to approve that the dignity of a Peerage of the United Kingdom should be conferred upon the Right Hon. Sir William Weir, Secretary of State for the Air Force.

Sir William Weir was appointed Secretary of State for the Air Force last April in succession to Lord Rothermere. He is a member of the Glasgow engineering firm of G. & J. Weir, Ltd. In 1915-16 he held the post of Scottish Director of Munitions.

In January, 1917, he became Controller of Aircraft Supplies under Lord Cowdray, and on the formation of the Air Ministry in January, this year, he became Director-General of Aircraft Production.

Under his able direction during 1917 the output of aircraft increased enormously, so that at no time for the past twelve months has the R.F.C. ever suffered from a shortage of machines. Without attempting the almost impossible task of reorganising the Supply Department, on account of the delay which would ensu and realising the importance of the time-factor, speeded up the existing system to an astonishing e tent, with highly satisfactory results, as the history the R.F.C. during 1917-18 bears witness.

All who have watched his work during the year 19 and the first half of this year will agree that few publ servants have so well deserved the honour of a peerag Apart from a peerage being the Air Minister's just du it is also good policy that he should go to the House Lords, so that when it is necessary for him to make public pronouncement it may be made in the intellectu and dignified atmosphere of the Upper Chamber, rath than that he should be subjected to the badgering politicians in the House of Commons.

One tenders to the new Peer, on behalf of concerned with aeronautics, hearty congratulations o his promotion and all good wishes for his future succes

C. G. G.

THE AERONAUTICAL SOCIETY OF GREAT BRITAIN.

The Annual General Meeting of the Aeronautical Society of Great Britain was held on Wednesday, June 19th, at 5 p.m., at the offices of the Society, 7, Albemarle Street, London, W.1. The Chairman of the Council, Major-General R. M. Ruck, C.B., C.M.G., R.E., presided.

The Chairman, in introducing the Annual Report of the Council and the balance sheet for 1917, said :—

"Before beginning the business of the meeting I wish to say a few words about the great loss which has been sustained by the Society in the death of Mr. B. G. Cooper.

"Mr. Cooper was for nearly eight years a member of the Council and for over four years secretary to the Society, during which time I was closely associated with him and can state from personal experience that the Society could not have had a more devoted official. Whatever action he took or opinion he expressed, it was always with the object of furthering the interests of the Society. He took a special interest in the scientific and educational aspects of Aeronautics and was always urging the necessity for maintaining the prestige of the Society in these particulars. He was a most conscientious secretary, and I am sure all members of the Society with whom he was brought in contact had the greatest respect for him.

"He resigned the secretaryship, having received the offer of an appointment at the Air Ministry, which he thought it his duty to accept. It is evident that his services were greatly appreciated by the Air Ministry for he received an honorary distinction and quite recently an important appointment. As to his death, all that need be said is that his life was given to further the interests of the national cause and the development of science, the subject on which he had concentrated the efforts of his valuable life.

"The Council of the Society have expressed their regret and sympathy with Mr. Cooper's relatives, and I am sure all members will be anxious to endorse this action.

"There has been a gratifying increase in membership and also in the funds of the Society, which are in a sound financial condition.

"The activities of the Society have been considerable, notwithstanding the exceptional difficulties due to the war. I wish to direct special attention to the work which is being done by members of the Society in connection with Government committees during the past year. I can state from personal knowledge that the status and valuable work of the Society are fully acknowledged by the Government authorities: a particularly gratifying example of which is the consent of the Secretary of State for the Air Ministry to preside at our annual Wilbur Wright lecture next week, on which occasion Dr. Durand, the distinguished scientific American aeronautical expert, has kindly consented to give a lecture.

"Another Committee which I would specially refer to is the Technical Terms Committee, presided over by Colonel O'Gorman. This Committee consists, in addition to representatives of the Aeronautical Society, of representatives of the Air Council, War Office, Admiralty, Patent Office, Meteorological Office, the Advisory Committee for Aeronautics, Royal Aero Club and the Society of British Aircraft Constructors. They have also been assisted by the National American Advisory Committee for Aeronautics, and the results are most valuable.

"Whilst all this points to the continued progress of the Society I think I ought to refer to some difficulties which have been experienced: more especially in securing an adequate attendance of members of the Council except in certain cases. It is quite realised how difficult it is under present circumstances for the members to attend more frequently, but if this cannot be done throws the management to a great extent on the Chairman and the Secretariat, which, I am sure, is not a satisfactory arrangement in the long run. I hope, therefore, it may be possible revise the activities of the Sub-Committees to a greater exte and that in future the bulk of the work will be done by th means.

"In saying this I do not reflect in any way on the work the Secretary and Staff; in fact, I am sure that all membe appreciate thoroughly the improvement in membership ar financial position which is due in considerable measure to M Faraday and his assistants. I am rather speaking of the gener policy which should be pursued by the Society with regard to i future organisation and activities. There is a great deal of mo useful work to be done in developing the scientific, technic and educational aspects of Aeronautics and I am convinced th this can only be effected satisfactorily by the combined effor of the Council and the members of the Society."

Sir Mackenzie Chalmers moved the adoption of the report. was, he thought, more than satisfactory, and those responsib for the working of the Society were to be congratulated on th record of work done and the great success achieved. He woul like to draw attention to two points. One was the very necessar work of co-ordinating much of the scientific work done on beha of the Civil Aerial Transport Committee. The second point wa the desirability of sympathetic co-operation with similar societi to their own in the United States.

Mr. Bairstow said that the first point was receiving attentio from the proper authorities.

The Secretary said that the Society was in regular correspond ence with the various American Aeronautical organisations.

Sir Mackenzie Chalmers said that was very satisfactory.

Mr. C. G. Grey seconded the adoption of the report. He asso ciated himself entirely with the congratulatory remarks of th mover of the resolution.

The Council's Report.

The Council's Report reads as follows :—

The past year has been one of continued success and a develop ment in the work and influence of the Society. As will sub sequently appear the membership has continued to grow, whil fresh opportunities for useful work are continually being offere as open to the Society's activities.

Membership.

In January, 1917, the total membership of the Society stoo at 343; the acting membership (i.e., those whose subscription were less than three years in arrears) was 297. Owing to th outbreak of war and the impossibility of carrying on the activitie of the Society at the time, for some considerable period th membership had shown a decline and the Council viewed this with some anxiety in view of the increasing demands made upon the Society's funds.

Towards the close of 1916, however, the Council decided to attempt to renew these activities, and it was clearly necessary that the Society should keep abreast of the progress that was being made in aeronautics through the agency of the Flying Services, the Manufacturers, and the National Advisory Committee on Aeronautics, with the assistance of the National Physical Laboratory and the Royal Aircraft Factory. The association of the Aeronautical Society with that of the recently formed Society of British Aircraft Constructors also made it

THE BRITISH & COLONIAL AEROPLANE CO., LIMITED

FILTON, BRISTOL

CONSTRUCTORS OF

The "Bristol" Aeroplanes.

CONTRACTORS TO

THE ROYAL AIR FORCE.

Telegrams:
"AVIATION, BRISTOL."



Telephones:
3906 BRISTOL
(Private Branch Exchange)

desirable that an effort should be made to increase the membership amongst the manufacturers.

After a good deal of consideration the Council decided that it was essential to adopt a forward policy, to remove the offices and library to more suitable premises, to institute an up-to-date series of lectures, to improve the Journal, to endeavour in every way to increase the membership, and to engage a competent staff sufficient in number to deal with the amount of work anticipated.

From subsequent experience, however, it has been apparent that the enterprising policy followed has been amply justified, the Society now numbers 772 members and is still rapidly increasing, so that it may be confidently predicted that before the next annual report is presented the number will be considerably in excess of 1,000. While expressing their satisfaction with the progress thus made, the Council view with even greater pleasure the quality of the new adherents to the Society's ranks, including as they do, many of those who names have in recent years been prominent in both the administrative or engineering branches of aeronautics in this country and the United States of America.

On the technical side of the Society, the improvement has been specially marked. The number of Fellows and Associate Fellows has increased from 79 to 226. As these are the official qualifications for an aeronautical engineer, all concerned may be congratulated upon the fact that in substance as well as in name the Society is now the recognised professional institution for this branch of engineering. Although it would be manifestly impossible during the present crisis of public affairs to require the test of examination for candidates admitted to these grades of membership the Council have in all cases rigorously exacted a high standard of qualification in making election to it

In regard to the student members of the Society the increase per cent. has been larger than in any other class of member. As these represent the Fellows and Associate Fellows of the future, the progress made in this particular is very gratifying.

The Civil Aerial Transport Committee.

One of the most important events in the year as far as the Society is concerned was the action of the Government in forming the Civil Aerial Transport Committee to report upon the possibilities of civil aerial transport after the war. This Committee was appointed in May last with Lord Northcliffe as chairman. The terms of reference were very wide and included aeronautical research and education in addition to many other matters in which the Society is specially interested. In fact the discussions of this Committee have had such a bearing upon the activities of the Society and upon those of the Society of British Aircraft Constructors that development in those directions has been deferred until after the Committee has made its report, an event which appears to be likely to occur in the near future.

It may be mentioned that in addition to Lord Northcliffe, the chairman, and the acting chairman, Major Baird, D.S.O., M.P., Under-Secretary of State of the Air Ministry, all the chairmen of the special sub-committees (five in number), Lord Sydenham, Major-General Ruck, Mr. White Smith, Mr. H. G. Wells and Colonel O'Gorman, and many of the members of the Civil Aerial Transport Committee are also members of the Aeronautical Society, so that the Society is very fully represented.

Meetings.

During the early spring of the present year the excellent series of lectures provided for the members was largely interrupted by public necessity. Many of the papers offered had on account of the subjects with which they dealt to be withdrawn, as in the opinion of the authorities it was prudent to withhold such matters from publication lest they prove of service to the public enemy In spite of this, however, many interesting and valuable papers were given and the Council desire to acknowledge the kindness of Major-General W. S. Brancker, Sir Richard Glazebrook F.R.S. (Director of the National Physical Laboratory), Sir Napier Shaw, F.R.S. (Director of the Meteorological Office) Major Lyons, F.R.S., Lieutenant-Colonel O'Gorman, C.B. Lieutenant-Colonel R. K. Bagnall Wild, A.I.D., Major Bertram Hopkinson, F.R.S., Sir Henry Fowler (Assistant Director of Equipment to the Air Ministry), Professor Groom, and Mr. G. Holt Thomas for their support in consenting to preside at the fortnightly meetings.

The Council also offer their most cordial thanks to Captain F. M. Green, Mr. W. H. Dines, F.R.S., Mr. J. R. Pannell Dr. A. P. Thurston, Mr. R. Borlase Matthews, Mr. W. H. Barling, Messrs. W. W. and A. G. Hackett, and Mr. W. J. John for the series of admirable lectures.

Popular Lecture.

A second popular lecture was arranged in the Central Hall Westminster, on June 21st, 1917, when Colonel Lord Montagu of Beaulieu lectured on "The World's Air Routes and their Regulation." The meeting was an unqualified success, over 2,500 persons being present. General R. M. Ruck, C.B., C.M.G. R.E., the Chairman of the Society, presided.

Juvenile Lecture.

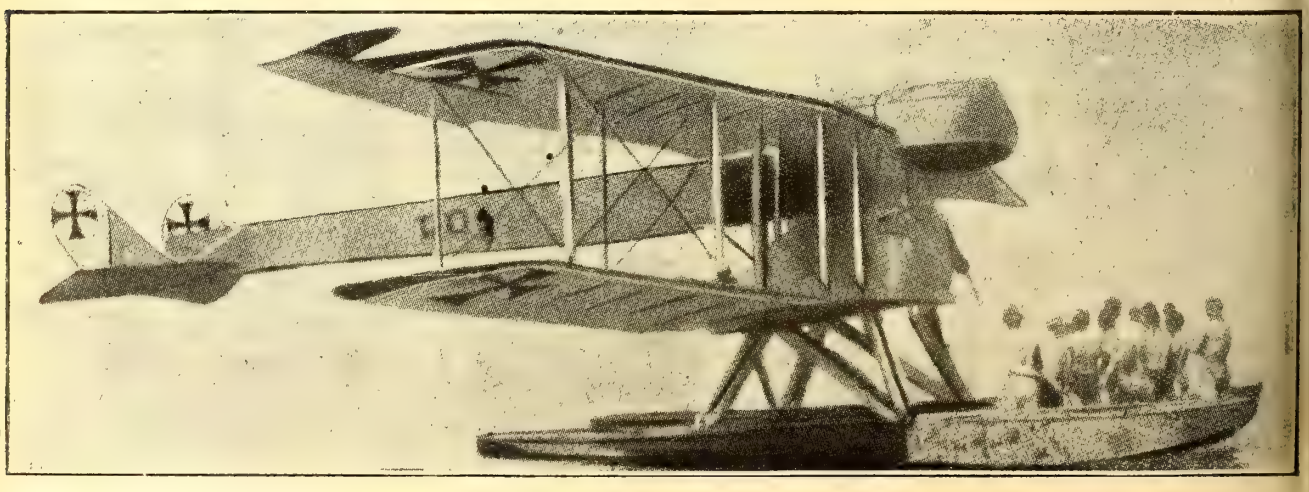
On January 2nd a new departure was made in the syllabus of the Society in that a Juvenile Lecture was given to the children of members and friends. An attendance of more than 500 young people listened to an excellent lecture on "The Aeroplane," kindly delivered by Dr. A. P. Thurston. The Council desire to acknowledge the assistance they received from Mr. Smith Woodward of the Natural History Museum, Mr. Edwards of the Northampton Polytechnic, Mr. A. F. Houlberg, Captain Maddick of the Scala Theatre, Messrs. Pathé Frères, Messrs. Calthrops, Ltd., Messrs. Handley Page, Ltd., and Dr. R. Mullineaux Walmsley, in providing and arranging slides, cinematograph, models and experiments.

Educational Lectures.

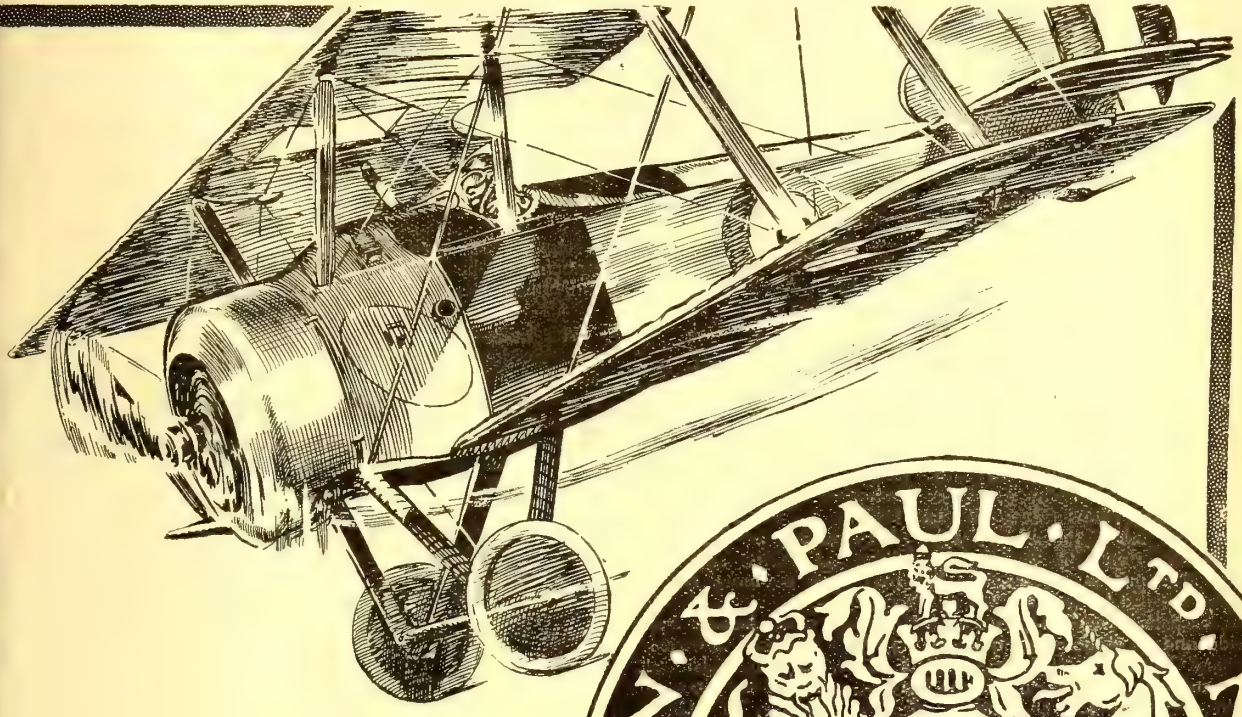
Acting on the suggestion of the Air Ministry courses of educational lectures similar to those delivered at Hendon last year through the generosity of Mr. Handley Page have been delivered in other principal centres of the aircraft industry, and these lectures, principally intended for the workpeople engaged in the industry, were very largely attended, the average attendance being over 500 per lecture. Courses of ten lectures each were given at Birmingham, Hammersmith, the Royal Aircraft Factory (South Farnborough), Bristol, Southampton, Peterborough, Leeds, Norwich, Lincoln and Coventry.

The thanks of the Society are due to the National Advisory Committee of Aeronautics and to the Air Ministry for the permission given for members of the staff of the National Physical Laboratory and for officers of the Flying Services respectively to give lectures. The Council confess their great indebtedness to Captain F. M. Green, Mr. E. F. Relf, Mr. A. Fage, Captain F. S. Barnwell, Captain Aston, Commander C. C. Turner, Lieutenant-Colonel J. N. Fletcher, Major G. I. Taylor, Professor Duffield, Mr. R. O. Boswall, Captain J. S. Irving, Mr. J. D. North, Mr. F. H. Bramwell, Commander W. Lockwood Marsh and Captain Fleming Williams, who so ably delivered the lectures.

The Council also desire to acknowledge the great kindness of Sir Henry Fowler, Major H. Grinsted and Mr. Greenley of the Royal Aircraft Factory, the Austin Motor Co., Ltd., of Birming-



Another view of the quaint German seaplane, which is faintly reminiscent of an experimental aeroplane built in the early days of the war, and called The "Sparrow."



BOULTON & PAUL LTD NORWICH

HONI SOIT MAL Y PENSE
DIEU ET MON DROIT
By Appointment

THE firm of Boulton & Paul, Ltd., was established in the Eighteenth Century and has enjoyed for many years a world wide reputation as engineers and craftsmen in metal and woods. In the making of aircraft it brings to bear on the problems of a new industry knowledge and experience possessed by scarcely any other firm. Coupled therewith is a determination to maintain at all costs the fame it has so long enjoyed for the high quality of its products.

BOULTON & PAUL, LTD.

Makers of Aircraft NORWICH

Founded 1797

Wires: Aviation, Norwich. *'Phone:* Norwich 651.

ham, Messrs. A. V. Roe, Ltd., Dr. A. Hill of the University College of Southampton, Messrs. Gwynnes, Ltd., of Hammersmith, the British and Colonial Aeroplane Co., the University of Bristol, the Blackburn Aeroplane and Motor Co., the University of Leeds, the Siddeley-Deasy Motor Car Co., Ltd., of Coventry, Messrs. Boulton and Paul, Ltd., of Norwich, Messrs. Ruston, Proctor and Co., Ltd., of Lincoln, and Messrs. Frederick Sage and Co., Ltd., of Peterborough, in assisting with the arrangements for the lectures.

The thanks of the Council are again due to Mr. Handley Page for arranging a second course of educational lectures at Hendon.

The Technical Terms Committee.

Recognising the importance of standardising the terms used in relation to aircraft, the Council last July appointed a strong sub-committee to deal with this subject. Other bodies interested were invited to send representatives, and the Sub-Committee, as finally constituted, consisted of the following:—Lt.-Col. O'Gorman, R.A.F., Mr. L. Bairstow, F.R.S., Lt.-Col. Briggs, R.A.F. (late Wing Comdr., R.N.), the late Mr. B. G. Cooper, Major A. R. Low, R.A.F. (late Lt.-Comdr., R.N.V.R.), and Mr. R. Borlase Matthews (Aeronautical Society); Messrs. W. Cannell, R. K. Pierson and R. Seabrook (Society of British Aircraft Constructors); Mr. C. G. Grey (Royal Aero Club); Lt.-Col. Cave Brown Cave, R.A.F. (late Wing Comdr., R.N.), Major Clarson, R.A.F., Captain Ewen, R.A.F., Lt.-Col. Landon, R.A.F., and Capt. Myers, R.A.F. (Air Ministry); Lt. A. C. Day (War Office and Admiralty); Mr. A. S. A. Ormsby (Patent Office); Mr. F. J. Selby (Advisory Committee on Aeronautics); and Sir Napier Shaw (Meteorological Office).

[One has taken the liberty here of correcting as nearly as possible the ranks of the various officers as varied since the Report was put into print, so that they may be more readily recognised.—Ed.]

On occasion the Sub-Committee has been much helped from outside and is grateful particularly to the National American Advisory Committee on Aeronautics for its sympathetic assistance. The American Missions in Europe have on occasion been present at the meetings in the persons of Dr. Durand, Mr Coker Clarkson and Mr. Ericson, and are now permanently represented on the Committee by Mr. W. G. Renals.

In view of the risk of overlapping of this important work, by arrangement with the Engineering Standards Committee, the Technical Terms Sub-Committee also acts as the Nomenclature Committee (Aircraft Section) of the British Engineering Standards Committee. The Sub-Committee has already examined and classified several hundreds of terms. It is dealing with the matter in an exhaustive manner and due acknowledgments should be made for much patient and laborious work in important undertakings on the part of all those who have co-operated. The Council desire especially to mention the services of Lt. Col.-O'Gorman, who undertook the onerous and responsible duty of Chairman of the Committee.

Patents Bill.

The Society took part in an important conference on the rights of inventors under the New Patents Bill, convened by the Institution of Mechanical Engineers, the Society being represented by Mr. Griffith Brewer, Mr. A. Pickles and the Secretary. The informal opinion of the conference was duly taken and negotiations are still pending.

Engineering Training.

On the initiative of Mr. A. E. Berriman, a member of the Council of this Society, a conference of all the bodies in this country interested in engineering education was summoned at the Institution of Civil Engineers on October 25th, the representatives of this Society being Dr. R. Mullineux Walmsley and Mr. B. G. Cooper. An influential committee was formed with the object of co-ordinating this branch of technical education, and to carry into effect the decision of the conference.

Department of Scientific and Industrial Research.

The Council has in common with the Society of British Aircraft Constructors taken the initial steps towards forming a Research Association in connection with this department.

The Library.

The Council desire to express their grateful acknowledgments to Mrs. McAlister, who has re-catalogued and arranged the whole of the Library. A large amount of binding has been done and many new books added. Every attempt is being made to bring the Library thoroughly up to date and as complete as possible. The Council desire to acknowledge gifts of books and prints from Mr. Charles Bright, Colonel de Villamil, Mr. Hatton Turner, and others. The Council also desire to acknowledge the courtesy displayed to this Society by the Society of Automotive Engineers in the United States in arranging with them for a supply of American aeronautical publications.

The Journal.

After running for exactly twenty years as a quarterly, the "Aeronautical Journal" is now being issued as a monthly, and it is hoped that members will appreciate this attempt to give them earlier access to the recorded proceedings of the Society. The price of the Journal to non-members has been largely increased, and the Council desire to point out that members of the Society now receive in the form of publications considerably more than the nominal amount of their subscription, and this quite apart from the other advantages of the Society.

Branches.

Negotiations are in progress for the establishment of graduate branches of the Society at South Farnborough, Hendon, Glasgow and Manchester.

Abstracts.

The need of a complete abstract of the world's Press and scientific journals dealing with aeronautical subjects, has long been felt. The Council are glad to announce that in consequence of arrangements which have been completed and with the valued assistance of the War Office and the National Physical Laboratory the Society will shortly be in a position to publish complete abstracts for the benefit of aeronautical science and industry in this country.

Administration.

The Council desire to acknowledge the very willing and able assistance which they have received from their Secretary (Mr. W. Barnard Faraday) and the staff in carrying out the programme of work sketched out above, together with the general secretarial duties of the Society.

Miss Phyllis Boyd, who was appointed Assistant Secretary in December, 1916, resigned her position for private reasons in September. The Council desire to acknowledge Miss Boyd's efficient services. After a little delay Miss Olive St. Barbe was appointed to the vacancy and has rendered valuable assistance to the Society.

Finance.

The financial position of the Society is satisfactory and continues to improve, but the Council strongly urge the necessity of a further increase in membership. Much work remains to be done which can only be accomplished by the greater income which will follow the enlargement of the Society.

The credit balance of the Society on December 31st, 1917, was £1,409 5s. 2d., an improvement of £704 15s. 8d. over the previous year, notwithstanding a large increase in necessary expenditure. On March 31st, 1918, the credit balance of the Society stood at £2,499 2s. 8d.

The Society has been in a position to convert the whole of the sums received as entrance fees and life compositions in accordance with the view of the hon. auditors that their money should be treated as capital and not as income. Investment was made in July of funds belonging to the Society amounting to £750 in War Loan, and in "Tank Week" in London on March 9th, 1918, the Society invested a further £100 in National War Bonds. Further sums are awaiting investment.

In addition to this the various trust funds which the Society administers stand at nearly £2,000. The Council are glad to announce that the lack of punctuality in payment of subscriptions, to which they drew attention in the last report, has been very much mitigated and that the number of overdue subscriptions is comparatively small.

The Hon. Officials.

The Council desire to express their most cordial thanks to the hon. auditors, Messrs. Jas. E. Ward and Co., for their services in auditing the books of the Society, and to Mr. B. Woodward, the hon. solicitor, who has advised them throughout the year.

Mr. R. Borlase Matthews moved the adoption of the accounts and balance-sheet. It was a great pleasure to learn of the satisfactory financial position of the Society. Mr. F. Bramwell seconded, and the accounts were unanimously approved.

The Council of the Society.

The Scrutineers announced the result of the Ballot, having found that on a count of the votes received the following were elected to the Council:—

Major-General Ruck,
Mr. L. Bairstow,
Dr. T. E. Stanton,
Maj. A. R. Low,
Lt.-Col. R. K. Bagnall Wild,
Mr. H. White Smith,
Dr. R. Mullineux Walmsley,
Mr. F. H. Bramwell.

AEROPLANE DESERTERS.

According to an Exchange message from Copenhagen three German aeroplanes participated in the flight of deserters from an aerodrome near Berlin to Scandinavia. One aeroplane reached the Danish island of Langeland, another came down at Valby, outside Copenhagen. The third was probably shot down in the Baltic.

NO. 12 SQUADRON, R.F.C. (1916), B.E.F.

Will officers who were serving in the above squadron in France in 1916 please communicate giving their present addresses to Lt.-Col. J. C. Halahan or Captain Creswell Turner?—Replies should be addressed c/o H., The Aeroplane.

ROLLS-ROYCE

Rolls-Royce Aero Engines like Rolls-Royce Cars are the Best in the World.

"By-the-way, I hear most enthusiastic accounts of the quality of these Rolls-Royce Engines from those who use them, and certainly Rolls-Royce, Ltd., deserve the thanks—which I believe have been expressed officially—of the Allies for the manner in which they have from the very beginning put all their energies into, and devoted all their resources to, the equipment of our aerial forces."

EDWIN CAMPBELL in *The Graphic*. 15/6/18.

ROLLS-ROYCE, LTD., *Contractors to H.M. Government,*
14 AND 15, CONDUIT STREET, LONDON, W. 1.
Telegrams: 'Rolhead Reg, London.' *Telephones: 1654 Gerrard (3 lines)*
AND AT DERBY, PARIS, NEW YORK, MADRID, BOMBAY, ETC.

ROLLS-ROYCE

THE PARLIAMENTARY AIR COMMITTEE.

About eighty Peers and Commoners interested in military aeronautics were present at a meeting of the Parliamentary Air Committee, held at the House of Commons on June 18th under the presidency of Mr. Joynson-Hicks. The following resolutions were passed :—

1. The Committee view with grave concern the arrangements for the construction and supply of high-power flying machines for next year's campaign.

2. They observe with great anxiety the heavy loss of life sustained in the training of pilots in this country, and the inadequate medical service.

3. They feel that the question of the Loch Doon aerodrome cannot be allowed to remain in its present inconclusive position, and that further investigation should be undertaken by the War Office Sub-Committee on National Expenditure, with the view of fixing responsibility for such an unwarrantable waste of public time, labour, and money.

4. They consider that the position of the Secretary of State for the Air Force, without a seat in either Houses of Parliament, is highly unconstitutional, and request the Government to provide a date for the discussion of a resolution on the subject.

(After the meeting it was ascertained that the Secretary of State, Sir William Weir, had been elevated to the Peerage.)

The peers attending the gathering included the Duke of Somerset, Earl of Powis, Earl Russell, Viscount Galway, Lord Aberdare, Lord Leith of Fyvie, Lord Saye and Sele, Brig.-Gen. Lord Montagu of Beaulieu, Lord Sydenham, and Lord Oranmore and Browne. Maj. Alan Burgoyne was present as hon. secretary.

THE SECRETARY OF STATE AND THE PARLIAMENTARY AIR COMMITTEE.

On June 20th Sir William Weir—as one must call him for lack of his new title—met a number of Members of Parliament, to enlighten them on the position of the Royal Air Force. One gathers that the Air Minister's statement was eminently reassuring, without in any way minimising the gravity of the situation in some respects.

AIRCRAFT IN THE HOUSE.

On June 20th **Colonel Yate** asked the Under-Secretary to the Air Ministry whether the officers of the Royal Air Force were about to be ordered to provide themselves forthwith with light blue uniforms instead of continuing to wear the recently-introduced khaki Royal Air Force uniform until the end of the war, as had been hitherto understood; and if so, considering the expense that would be inflicted upon all the young officers who had provided themselves with the khaki uniform, the Air Board would consider the advisability of postponing the issue of the proposed orders.

Major Baird: This matter is under consideration. If the change is decided upon officers will not be ordered to provide themselves with the new uniform until their present uniform is worn out.

Colonel Yate asked whether it was not the case that the present uniform was only brought into use in March last, and was it not very unfair to bring in another before the end of the war.—**Major Baird** replied that if a new uniform was brought in, it ought not to be compulsory until the present uniform was worn out.—**Mr. Harcourt:** Has the hon. and gallant gentleman considered the point that these officers in large numbers already have a military khaki uniform, a Royal Air Force uniform, and a naval uniform, and does he consider another uniform is justified on public grounds?—**Major Baird** said the whole question had been gone into. It was a very important matter from the point of view of *moral* and *esprit de corps* of the force, and if it turned out to be necessary and desirable that a new uniform should be decided upon for the corps as a whole, the officers would not be called upon to incur expense before the old one was worn out.

AN AIR MINISTRY ADDITION.

Mr. Frederick Palmer, C.I.E., M.I.C.E., partner in the firm of Messrs. Rendel, Palmer, and Tritton, consulting engineers, has accepted the invitation of the Secretary of State for the Royal Air Force to act as honorary adviser to the Air Ministry in engineering questions associated with the Department of Works and Buildings.

Mr. Palmer, who was born in 1862, was an articled pupil and assistant engineer on the Great Western Railway. While engineer to the East Indian Railway, from 1884 to 1901, he constructed the bridge over the River Sone, the largest bridge in India. He became chief engineer of the Calcutta Port Commissioners in 1901, and eight years later was appointed chief engineer of the Port of London Authority, a position which he held until 1913.

RECENT AIR OPERATIONS.

Mr. Percival Phillips, the "Daily Express" Special Correspondent, with the British Armies in the Field, in a message, dated June 24th, says :—German losses in aeroplanes have been very severe of late. Long-distance bombing machines, which form the backbone of the new offensive formations, have been lost while returning from their expeditions over the British lines, sometimes in consequence of attacks by British battle squadrons and also through crashing heavily while trying to land in the darkness.

I understand that the attack on London on the night of May 19th-20th was an especially disastrous enterprise. Seven machines were reported missing, and three others crashed on landing, a the crews being killed.

The activity of British bombers is unrelaxed. During th second week in June nearly 120 tons of bombs were dropped o various military targets, and over 60 hostile aeroplanes wer brought down, in addition to 31 driven down out of control.

Among recent feats of British aviators was the location an pursuit of a long-range gun on the railway which was preparin to fire into British back areas. The gunners were attacked re peatedly as they shifted from place to place, and finally, afte moving back nearly three miles, they gave up the attempt i disgust and the gun remained silent.

FOR A GOOD CAUSE.

It will be remembered that in September, 1914, at the speci request of Gen. Sir David Henderson, K.C.B., D.S.O., the Aeri League of the British Empire, organised a fund for assisting th widows and other dependents of N.C.Os. and men of the Roy Air Force who lose their lives on active service.

The fund has been instrumental in giving financial assistance t over 160 families, but the claims are coming in so increasingl that it has been decided to hold a performance at the Scal Theatre, Charlotte Street, W., on June 30th, which will be unde the patronage of :—The Rt. Hon. Sir William Weir, Secreta of State for the Air Force, and now a Peer; Maj.-Gen. Sir F. H Sykes, C.M.G., Chief of the Air Staff; Maj.-Gen. Sir Godfre Paine, K.C.B., M.V.O., the Master-General of Personnel; Maj Gen. H. T. Arbuthnot, C.B., chairman and hon. treasurer of th fund.

The use of the theatre has been given gratuitously by the pr prietor (Dr. Distin-Maddick), and the performance is being o ganised by Lt. St. J. Shadwell Clerke and Lt. E. Clive Fowle both of the R.A.F.

Permission has been granted by the Air Ministry for the exhib tion of special films, which have never been shown publicly, and number of artistes have given their services.

The prices of tickets are as follows :—Dress circle stall 10s. 6d., 7s. 6d., 5s.; orchestra stalls, 7s. 6d., 5s.; balcony (upp circle), 3s., 2s.; pit stalls, 2s.

Applications for tickets should be addressed to Mr. H. H. Va nier, hon. secretary of the fund, the Aerial League of the Briti Empire, 46, Dover Street, W.1.

A CANADIAN AERIAL MAIL.

The "Daily Telegraph" correspondent at Montreal, cablir on June 23rd, said that the first aerial mail delivery in Cana was to be inaugurated on Monday, June 24th, between Montre and Toronto, a distance of 320 miles. Capt Bryan Peck, the Royal Air Force, who has seen several years' service France, was to leave Montreal at sunrise, with a packet of 3 letters, directed to various persons in Toronto.

The aviation authorities at Montreal and Toronto intend th as the beginning of aerial mail service developments, with t object, at the close of the war, when hundreds of expert Canadi military aviators return to Canada, of establishing a regul mail service between Montreal, Toronto, and other cities.

The Canadian air service has been growing rapidly lately, a the training camps in the neighbourhood of Toronto are fille a feature being the popularity of this service with the Frenc Canadians, who have sent a large number of men to train f aviation service overseas.

Later news says that Capt. Peck duly started on Monday.

FINDINGS NOT KEEPINGS.

From the "Stratford Express," June 15th, 1918 :—

At East Ham Police Court, on Thursday, Charlotte Wall w summoned for failing to notify the finding of an article from a enemy aeroplane.

Station-Sergt. Smith 66K, said that on May 26th he sa Mrs. Wall, and told her he had information that she had portion of a machine in her possession. She produced a gaug She said it was in her back garden, and thought it was of litt value.

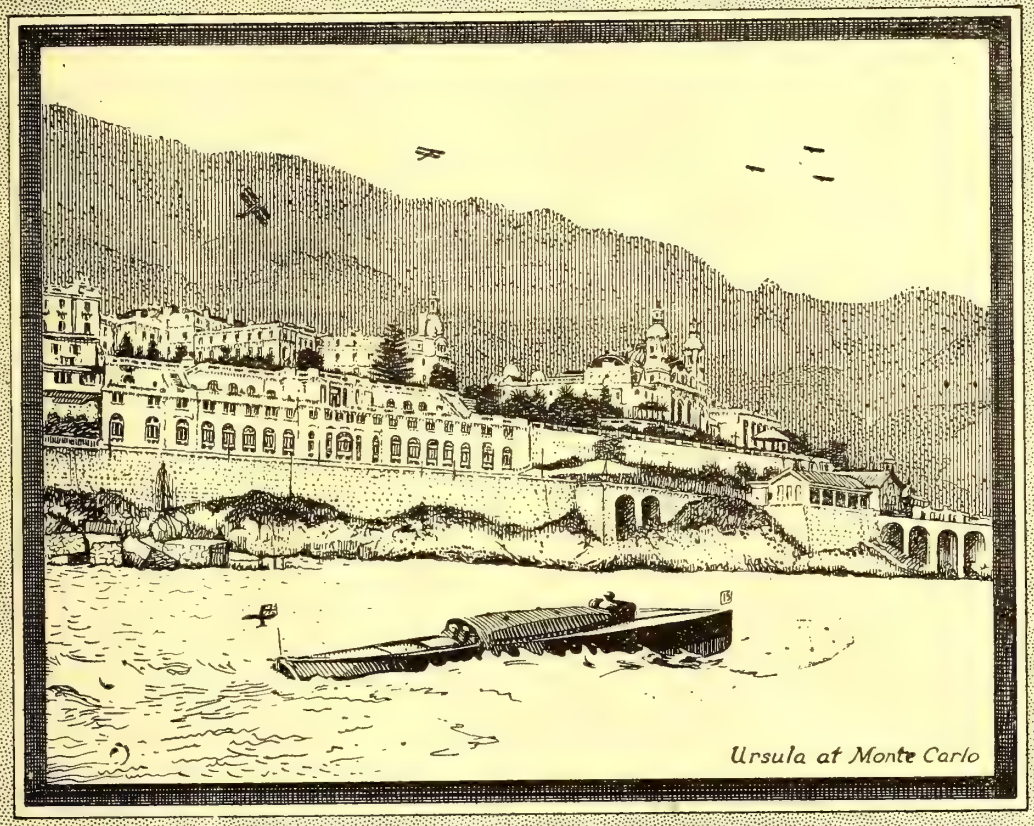
An Army Captain described the article as a height gauge fro a German aeroplane that was brought down by gunfire. Th instrument was made at Stuttgart.

Mr. Grubbe: If not tampered with, it would in all probabili have registered the heignt which the aeroplane had reached?- That is so—which information, of course, is of great valu to us.

Defendant pleaded not guilty, and called her husband, a stok in the Navy, who said he picked up the gauge in his garde A gentleman from the Town Hall came to his house, and witne gave him a souvenir, and thought he would keep the gaug himself as a souvenir. This gentleman reported it to the polic and when the officers called, he—not his wife—handed the the gauge.

P.C. Randall, 92K, who accompanied Station-Sergt. Smith confirmed the latter's statement. He did not see the husband.

Mr. Grubbe said he believed the police evidence, and reminde the defendant that the offence came under a very importa section of the Defence of the Realm Act. She was liable to penalty of £100, in addition to six months' hard labour. H imposed a fine of 20s. or 13 days.



SAUNDERS of COWES

S.E. Saunders, Ltd.

Designers & Constructors of Air & Marine Craft

EAST COWES. I.W.

Telegrams "Consuta" E Cowes
Phone Cowes 193. (4 Lines)

SB AC
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS



NAVAL & MILITARY AERONAUTICS



GEOFFREY WATSON

FROM THE "LONDON GAZETTE."

ADMIRALTY, June 18th.

The King has been pleased to award the Albert Medal to Actg. Flt. Comdr. Paul Douglas Robertson, R.N.A.S., in recognition of his gallantry in endeavouring to save life in February last. The circumstances are as follows:—

On February 28th, 1918, a seaplane got out of control and spun to the ground. Actg. Flt. Comdr. Robertson, the observer, jumped from the machine just before it reached the ground and landed safely, as the ground was marshy. The pilot, Flt. Lt. H. C. Lemon, was imprisoned in the seaplane, which, on striking the ground, immediately burst into flames, and, notwithstanding that the vicinity of the seaplane was quickly a furnace of blazing petrol, and that heavy bombs, a number of rounds of ammunition, and the reserve petrol tank were all likely to explode, Actg. Flt. Comdr. Robertson returned and endeavoured to extricate the pilot, and only desisted when he had been so severely burned in the face, hands, and leg that his recovery was for some time in doubt.

He displayed the greatest gallantry, self-sacrifice, and disregard of danger in his efforts to extricate the pilot.

AIR MINISTRY, June 18th.

R.A.F.—The follg. temp. appts. are made at the Air Ministry:—Staff Officer, 1st Cl. (Q.).—A. Sykes, O.B.E. (temp. Lt.-Col. in Army), and is granted a temp. commn. as Lt.-Col., April 15th.

Staff Officer, 2nd Cl. (S.).—Capt. (temp. Maj.) V. Ward-Brown, M.C., May 20th.

Staff Officer, 4th Cl. (S.).—Sec. Lt. J. Keyes, and to be temp. Lt. while so empld., May 26th.

The follg. temp. appts. are made:—

Staff Officers, 2nd Cl.—And to be temp. Majs., if not already holding that rank (Air):—Capt. G. C. Anne, Capt, T. E. Longridge, April 1st; (Q.) Maj. J. W. Allsop, April 20th; (P.) Capt. L. M. P. Sullivan, June 11th.

Staff Officers, 3rd Cl. (Air):—Capt. E. N. E. Waldron, April 1st; Lt. (temp. Capt.) E. D. Cole, June 8th; (P.) Capt. (temp. Maj.) H. F. A. Gordon, and to relinquish his temp. rank, May 9th; Lt. J. A. D. Wallis, and to be temp. Capt. while so empld, May 15th.

FLYING BRANCH.—Maj. J. A. Cunningham to be temp. Lt.-Col. while empld. as Lt.-Col. (A. and S.), June 2nd.

Lts. to be temp. Lt.-Cols. while empld. as Lt.-Cols. (K.B.):—(Temp. Maj.) S. Bell (Temp. Capt.) O. A. Butcher, D.S.C., May 22nd.

Lts. (temp. Capts.) to be temp. Majs. while empld. as Majs. (A. and S.):—A. J. M. Clarke, April 1st; J. B. Solomon, M.C., April 13th.

Lts. (Hon. Capts.) to be temp. Majs. while empld. as Majs. (K.B.):—E. A. O. Auldjo-Jamieson, A. W Cassy, H. E. Crawfurd, J. de Francia, J. H. D. Grant, M. Lyon, H. C. Morris, R. S. Smith, E. Willis, April 24th.

Lts. (Hon. Capts.) to be temp. Majs. while empld. as Majs. (K.B.):—P. H. Hepburn, J. Wann, April 24th.

Lts. to be temp. Capts. while empld. as Capts. (A. and S.):—R. Halley, E. G. B. Morton, S. E. Siedle, June 5th; J. D. de Pencier, June 7th; E. W. Fletcher, June 8th; F. J. Davies, N. P. Davis, June 9th.

Lts. (Hon. Capts.) to be temp. Capts. while empld. as Capts. (A. and S.):—A. W. I. Ashe, E. G. Hopcraft, J. F. Horsey, J. G. Ireland, W. R. Kenny, A. R. T. Pipon, G. H. Simpson, L. H. Wilkins, May 1st; R. E. Dean, June 6th.

Lts. to be temp. Capts. while empld. as Capts. (K.B.):—(Temp. Capt.) T. F. Morris, (Hon. Capt.) A. J. O'Reilly, (Hon. Capt.) W. H. Sharpe, April 24th.

W. Wallace (Lt., actg. Capt., R.F.A., T.F.) is granted a temp. commn. as Lt., and to be temp. Capt. while empld. as Capt. (K.B.), May 25th.

R. H. Galloway (prob. Flt. Officer, late R.N.A.S.) is granted a temp. commn. as Sec. Lt. (A. and S.), June 2nd.

Temp. Sec. Lt. H. W. Petter (late Gen. List, R.F.C., on prob.) is confirmed in his rank as temp. Sec. Lt. (A. and S.), April 3rd.

Temp. Sec. Lt. W. Thornton (late Gen. List, R.F.C., on prob is confirmed in his rank as temp. Sec. Lt. (K.B.), April 1st.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are co firmed in their rank as temp. Sec. Lts (Obsr. Officers):—A Slinger, May 2nd; L. F. Thurlow, May 7th; M. B. Josep May 8th; E. Cooke, May 9th; H P. Bennett, J. B. Sande A. Todd, A. W. Baker, May 14th; S. Griffin, A. S. Withe May 17th; F. F. Collins, A. C. Howell-Jones. P. Hughes, Ma 18th; H. S. G. Palmer, T. O. Wrightson, May 19th; F. J. L Hudson, S. Davidson, N. B. Harris, D. K. Moore, May 20th D. R. Bradley, L. G. Cocking, T. B. Dodwell, E. D. Decl May 23rd; A. Spotswood, A. R. Crosthwaite, S. H. Hamblin D. C. Burke, A. C. Clinton, May 26th; E. Hardcastle, F. Ralph, H. C. Grimes, F. B. Sagar, May 27th; W. A. F. Jack son, H. H. Watson, J. D. Parker, N. McL. Hill, W. N. Va Someren, May 28th; F. S. E. McRae, H. N. T. Pearso May 29th; G. D. Knighton, C. S. Jefferson, S. E. Gran F. R. G. Spurgin, T. Elliott, May 30th; J. H. Hay, C. E Pullen, May 31st; R. C. McAulay, W. G. Duncan, E. W Tatnall, F. H. McNay, A. E. Sherwood, A. W. G. Luke, H. E Ffrench, June 1st; J. W. Weller, T. D. Fitzsimon, June 2nd E. J. Clark, A. G. Thistle, A. O. Fraser, A. J. Inkster, Jun 3rd; J. W. Benton, June 4th; F. E. Donkin, June 5th; J. E Weston, C. Wealthall, June 6th.

The follg. are granted temp. commns. as Sec Lts., Obsr Officers:—W. Duce (Lt., Lond. R., T.F.), and to be Hon. Lt. April 24th; C. V. Carr (Sec. Lt., W. Rid. R., T.F.), April 28th T. R. G. Cooke (Sec. Lt., E. Kent R., T.F.), May 1st; C. B Whyte (temp. Sec. Lt., R. Scots), May 2nd; A. J Melanson (Lt., Can. For. Corps) and to be Hon. Lt., May 8th; E. B Lewis (Sec. Lt., R. Fus., Spec. Res., May 9th; A. V. Bollin (temp. Sec. Lt., L'pool R.), May 11th; H. B. B. Wilson (Lt. Glasgow Yeo., T.F.), and to be Hon. Lt., May 14th; A. A Malcolm (Sec. Lt., Lrs.), May 16th; N. F. Penruddocke (Lt. A.S.C.), and to be Hon. Lt., May 17th; W. Susman (temp Sec. Lt., W. Rid. R.), May 18th; J. K. Clarke (temp. Sec. Lt. attd. Conn. Rang.), May 19th; J. S. Muir (Sec. Lt., High L.I.), H. M. Moodie (Sec. Lt., R. Highrs.), C. W. T. Colmar (Sec. Lt., C. Gds., Spec. Res.), May 23rd; W. H. Mason Springgay, M.C. (temp. Lt., E. Kent R.), and to be Hon Lt. W. R. Patey (temp. Sec. Lt., R. Ir. Rif.), S. Jackson, M.C (Lt., R.F.A., T.F.) and to be Hon. Lt., T. H. Lewis (temp Sec. Lt., Lan. Fus.), May 24th; H. Booth (temp. Sec. Lt., W York, R.), J. C. Anderson (Sec. Lt., R.G.A., Spec. Res.), B. E. Scott, M.C. (Lt., Can. F.A., C.E.F.) and to be Hon. Lt., R. Lean (Sec. Lt., High. L.I., T.F.), G. H. Kemp (temp. Sec. Lt., Durh. L.I.), May 26th; B. W. Wilson (Sec. Lt., Lond. R., T.F.), D. Gale (temp. Capt., Lan. Fus.) and to be Hon. Capt., R. L. Aslin (Lt., Lond. R., T.F.) and to be Hon. Lt., E. A. Collis (temp. Lt., R.E.), and to be Hon. Lt., N. W. Helwig (Lt., Cent. Ont. R., C.E.F.) and to be Hon. Lt., B. A. Tussaud (Sec. Lt., Glouc. R., T.F.), E. Walker (Sec. Lt., W. Rid. R., T.F.), May 27th; H. A. Coysh (Sec. Lt., R.G.A., Spec. Res.) H. Rhodes (temp. Sec. Lt., attd. York. R.), W. Dixon (Sec. Lt., Sea. Highrs., Spec. Res.), R. H. Norris (Sec. Lt., Northd. Fus., Spec. Res.), May 28th; G. E. Bullock (Lt., N. Staff. R., T.F.) and to be Hon. Lt., J. W. Pryor (temp. Lt., S. Lan. R.) and to be Hon. Lt., H. S. Collett (temp. Lt., Suff. R.), and to be Hon. Lt., L. E. O. Lounds (Lt., W. York. R., T.F.) and to be Hon. Lt., A. Briercliffe (Lt., Lan. Fus., T.F.) and to be Hon. Lt., A. V. Collins (temp. Lt., attd. L'pool R.) and to be Hon. Lt., C. W. Wridgway (Sec. Lt., Middx. R.), A. West (temp. Lt., A.S.C.) and to be Hon. Lt., J. C. Batty (temp. Lt., attd. Durh. L.I.) and to be Hon. Lt., T. W. Moore (temp. Lt., R. Ir. Rif.), and to be Hon. Lt., A. P. Ledger (temp. Sec. Lt., R.W. Kent R., May 29th; F. Birkett (temp. Sec. Lt., Rif. Brig.), S. C. Shillingford (temp. Lt., R. Fus.), and to be Hon. Lt., E. Biggs (temp. Sec. Lt., K.R.R.C.), M. Ross-Jenkins (temp. Sec. Lt., Glouc. R.), May 30th; H. C. Laker (temp. Sec. Lt., Shrop. L.I.), T. Foster (Sec. Lt., R.F.A., T.F.), F. C. Peacock, M.C. (Sec. Lt., R.F.A.), R. H. V. R. Scherk (Lt., Cent. Ont. R., C.E.F.), and to be Hon. Lt., F. B. Denison (Lt., Cent.

it. R., C.E.F.), and to be Hon. Lt., May 31st; R. W. Harvey t., Dorset R., Spec. Res.), and to be Hon. Lt., M. C. Sexton mp. Lt., attd. L'pool R.), and to be Hon. Lt., E. G. Thomas ec. Lt., R.G.A., Spec. Res.), J. T. Thursfield (temp. Sec. Lt., . War. R.), A. Gilchrist (temp. Sec. Lt., attd. Rif. Brig.), ne 1st; R. H. Shepherd (Sec. Lt., Suff. R.), June 2nd; E. H. anning (temp. Sec. Lt., Glouc. R.), W. O'Reilly-Patey (Sec. Lt., nd. R., T.F.), June 3rd; T. H. Barry (Sec. Lt., R.G.A.), ne 4th; C. H. F. Nesbit (temp. Lt., E. Kent R.), and to be on. Lt., June 5th; W. S. Melvin (temp. Sec. Lt., attd. Rif. rig.), C. P. Shilton (Sec. Lt., Leic. R.), C. A. Horn (temp. t., Gen. List, New Armies), and to be Hon. Lt., June 6th.

The follg. Cadets are granted temp. commns. as Sec. Lts. (A. d S.):—D. S. Dunn, J. F. Meek, H. G. Murray, May 1st; . I. Ashley, J. E. Berry, K. W. Biglow, J. F. Boone, J. angiamila, R. S. Carey, E. H. Carlisle, F. W. Chambers, . L. Child, E. W. Cockerline, G. T. Collinson, J. T.-K. ossfield, P. R. Davies, W. K. Doneville, J. R. Desy, C. W. uncan, L. S. Eckart, K. M. Guthrie, S. L. Haley, F. S. E. all, A. J. Hiff, S. R. Housen, A. W. Johnston, A. J. Keif, . M. Kidd, M. P. LaFleur, D. A. MacDonald, J. A. V. cRobert, F. S. J. Miller, M. J. Moffat, G. B. Moxon, W. uirhead, J. G. Osborne, L. W. Ouellette, E. H. Pepper, W. S. ennington, E. F. Pineau, S. J. Reid, H. C. Rochester, A. B. osevear, S. R. Seaman, D. McG. Spencer, H. J. Sinclair, A. l. Spracklin, R. E. Standfield, R. Stowell, G. V. Straker, R. K. arr, H. Thomas, J. A. Tomson, R. J. Tomson, W. L. Vennell, . Vigne, R. V. Weston, A. H. Williams, F. R. Winter, R. D. B. 'ood, W. H. Young, W. Evans, R. W. Hopper, A. G. Ridout, E. Henry, J. L. Spencer, May 2nd; H. Kennedy, May 4th; B. Abraham, W. V. Adams, K. W. Akers, G. G. Armstrong, . D. Beaudry, J. C. B. Brady, N. T. Brown, O. D. Bell, J. B. egin, W. G. Black, E. Brady, G. Brown, K. C. Brown, F. D. larke, C. E. Durant, D. K. Donnelly, E. A. Dunn, G. C. arner, H. McK. Gordon, R. H. Gowan, W. S. Horne, S. amilton, L. Kane, W. R. Kellough, G. R. Klinck, P. L. De la lane, L. K. Lloyd, A. R. Lee, E. B. Mathews, J. W. Macarthur, . B. McNown, C. E. Mitchell, W. K. Misenhimer, C. J. Mitchell, . D. Macpherson, G. E. Mullin, J. L. Miller, N. A. McIntosh, V. Norwood, W. H. Ptolemy, H. W. Pope, M. N. Pegg, . A. Raybone, W. C. Ryder, A. L. Robinson, R. F. Russell, . C. Roberts, J. W. Reid, E. W. Reis, E. G. Shafer, F. T. argent, K. M. Skene, G. W. Stewart, T. A. Sephton, W. R. pittal, H. E. Sullivan, E. K. Sargent, S. S. Scott, J. G. Spence, V. P. Wemple, O. C. S. Wallace, May 9th.

The follg. Cadets are granted temp. commns. as Sec. Lts. bsr. Officers.—W. F. Grainger, May 4th; W. G. Gardner, C. F. erry, A. B. Anderson, H. S. S. McGill, J. C. Walker, G. rowther, W. R. S. Fox, R. C. Capel-Cure, J. G. MacDougall, . Bardsley, C. Walton, C. H. Bullen, May 18th; H. H. Fitz-immons, F. S. Occomore, W. D. Houston, P. Evans, May 25th; I. P. Hodges, T. V. Robinson, C. O. Shelswell, L. W. King, . I. Riley, G. S. Turner, H. S. Musgrove, L. R. Reeves, C. E. pinks, May 31st; G. M. Worthington, J. S. Cryan, C. V. R. Browne, G. J. L. Potts, A. J. Cunningham, W. H. Warner, M. G. Wilson, F. K. Wilson, F. H. Bugge, G. J. Lewin, C. Peacock, C. J. Swatridge, S. A. Bird, W. Cowden, H. H. Creighton, W. L. E. Dickson, T. G. Evans, H. Griffiths, A. F. Honeysett, W. Holmes, R. I. Hulley, R. E. Hagley, J. W. Hamilton, J. W. Johnson, F. G. C. Maggs, W. A. Mercer, . F. Mason, N. H. Manners, A. B. Meller, J. Kelly, June 8th; M. I. Hough, H. Baldwin, F. F. Crump, June 11th; C. White-head, J. Sheach, June 15th.

Lt. M. T. Trotter (Lt., Quebec R., C.E.F.) relinquishes his ommn. on account of ill-health contracted on active service, une 19th.

Administraiive Branch.—V. Henry, C.B. (Maj. Res. of Officers, Lt.-Col., ret., S.R.), is granted a temp. commn. as Lt.-Col., May 6th.

To be temp. Capts. while empld. as Capts.:—Lt. F. J. Cooke from Tech. Lt.), Sec. Lt. (Hon. Capt.) F. O. Sonderbye, Sec. Lt. D. R. Thomas (from Sec. Lt., Tech.), Lt. (Hon. Capt.) R. F. Wills, April 22nd; Lt. W. H. Osman, April 26th; Sec. Lt. A. C. Rowden, May 11th; Lt. L. E. Anstey-Bennett, June 1st; J. Ramsay, M.C. (Qrmr. and Hon. Lt. in Army), is granted a temp. commn. as Lt., and to be temp. Capt., April 22nd; Lt. temp. Capt.) W. W. Gibson to retain his temp. rank, but with pay and allowances of Lt., April 22nd; Lt. P. H. Ross, June 10th.

Sec. Lts. to be temp. Lts. while empld. as Lts.:—E. F. P. Bartlett, M.C., April 1st; S. G. Lewis, April 23rd.

Lt. (Hon. Capt.) C. A. Lord Ossulston to be Lt. (Hon. Capt.), from A. and S., June 5th.

J. R. Croxford (Hon. Capt. in Army) is granted a temp. commn. as Lt., and to be Hon. Capt., April 12th (substituted for notification in "Gazette," June 4th).

Temp, Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts.:—R. J. H. F. Beresford, April 22nd; J. C. Duncan, P. Gent, H. S. Reddick, E. Smith, C. R. Southey, F. E. Miles, G. W. C. Dawson, J. P. Young, June 3rd.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts.:—C. O. Bennett, H. S. Fielding, May 27th.

Temp. Lt. G. Dodds, from A. and S., to be temp. Sec. Lt., and to be Hon. Lt., May 27th.

A. E. Hale (temp. Sec. Lt., Labour Corps) is granted a temp. commn. as Sec. Lt., May 27th.

The follg. are granted temp. commns. as Sec. Lts., and to be Hon. Lts.:—S. F. R. Hulbert (temp. Sub-Lt., R.N.V.R., R.N.D.), H. L. Webley (temp. Sub-Lt., R.N.V.R., R.N.D.), April 16th; J. H. Bryen (temp. Lt., M.G.C.), and to be Hon. Lt., June 3rd.

Sec. Lts. relinquish their commns. on account of ill-health contracted on active service, and are granted the hon. rank of Sec. Lt.:—S. A. Alcock, L. Lomax, June 19th.

Sec. Lts. resign their commns.:—J. S. D. Angus, V. R. W. Nash, June 19th.

Sec. Lt. A. Wallas relinquishes his commn. on account of ill-health caused by wounds, and is granted the hon. rank of Sec. Lt., June 19th.

Sec. Lt. T. A. Darrington to relinquish his commn. on account of ill-health, and to be granted the hon. rank of Sec. Lt., June 19th.

Technical Branch.—To be temp. Majs. whilst empld. as Majs.:—Lt. (temp. Capt.) S. McClure, April 14th; Capt. L. E. Palmer, May 27th; Lt. (temp. Capt.) E. F. B. Curtiss, May 29th; Capt. (Hon. Maj.) J. Liddle, June 6th; Capt. (temp. Maj.) J. W. Burt retains his temp. rank whilst so empld., June 8th.

Lts. to be temp. Capts. whilst empld. as Capts.:—(Hon. Capt.) F. D. H. Bremner (from A. and S.), May 17th; W. H. Ellison, June 10th.

Sec. Lt. V. L. Fielder to be temp. Lt. whilst empld. as Lt., May 29th.

The follg. are granted temp. commns. as Sec. Lts.:—F. L. Robinson (Lt., R.H.A., T.F.), and to be Hon. Lt., April 8th; J. J. Martin (temp. Lt., Gen. List, New Armies), and to be Hon. Lt., May 25th.

Temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts.:—P. S. Beauford, April 13th; C. G. Massy-Dawson, May 17th; M. E. Holroyd, May 27th.

The initials of Sec. Lt. (Hon. Capt.) W. H. P. Rees are as now described, and not as in "Gazette" of May 24th.

Memoranda.—Capt. V. Ward-Brown, M.C., to be temp. Maj. whilst empld. as S.O. 2, April 1st.

Sec. Lt. P. W. Abernethy relinquishes his commn. on ceasing to be empld., April 16th.

War Office, June 19th.

REGULAR FORCES. — Establishments.—R.F.C. — Mil. Wing.—The following appts. are made:—Equipt. Officers, 1st Cl.—Lt. (temp. Capt.) W. H. Dolphin, Ind. Army Res. of Officers, from an Examining Officer (graded as a Flt. Comdr.), Schools of Mil. Aeronautics, and to retain his temp. rank while so empld., Jan. 20th.

Gen. List.—Cpl. C. G. de Monalt, from R.F.C., to be temp. Sec. Lt., Oct. 24th, 1917.

To be temp. Hon. Lts., while empld. as Asst. Insprs., Aeronautical Inspn. Dept.:—H. A. Benson, J. B. Gott, W. E. Guttentag, F. W. Jecock, J. C. Kernot, T. T. Leopard, P. A. Melhuish, B. J. Samuels, G. H. Wadsworth, D. F. Young, H. J. Hewlitt, S. H. Troughton, W. G. Meyer, R. W. Sloley, R. E. Barnard, P. J. Boucher, W. V. H. Capps, W. Bryson, W. A. Pett, W. D. Ditchburn, R. S. Felgate, C. C. G. Rudorf, Oct. 1st, 1917.

War Office, June 20th.

REGULAR FORCES—Establishments—R.F.C.—Mil. Wing. —Flt. Comdrs.—From Flying Officers, and to be temp. Capts. whilst so empld.:—Lt. R. S. Larkin, M.C., Spec. Res., Jan. 22nd; Temp. Sec. Lt. W. M. Blackie, M.C., Gen. List, Feb. 25th.

Admiralty, June 21st.

The King has been pleased to approve of the award of Bars to the Distinguished Service Cross to the following officers late of the Royal Naval Air Service:—

A Bar to the Distinguished Service Cross.

Lt. (temp. Capt.) S. T. Edwards, D.S.C., R.A.F.

For conspicuous bravery and most brilliant leadership of fighting patrols against enemy aircraft. On May 2nd, 1918, while leading his patrol of four scouts, he encountered a hostile formation of eight enemy scouts, and drove down one enemy machine completely out of control. Soon afterwards he engaged another formation of six enemy scouts, driving down one to its destruction while his patrol accounted for another. He only broke off the fight owing to lack of ammunition. He has destroyed or driven down out of control many enemy machines since he was awarded the Distinguished Service Cross, and has at all times shown the greatest gallantry and a fine offensive spirit.

Lt. (Hon. Capt.) A. R. Brown, D.S.C., R.A.F.

For conspicuous gallantry and devotion to duty. On April 21st, 1918, while leading a patrol of six scouts he attacked a formation of 20 hostile scouts. He personally engaged two

Fokker triplanes, which he drove off; then, seeing that one of our machines was being attacked and apparently hard pressed, he dived on the hostile scout, firing the while. This scout, a Fokker triplane, nose-dived and crashed to the ground. Since the award of the Distinguished Service Cross he has destroyed several other enemy aircraft, and has shown great dash and enterprise in attacking enemy troops from low altitudes despite heavy anti-aircraft fire.

Lt. (Hon. Capt.) A. T. Wheatly, D.S.C., R.A.F.

For conspicuous gallantry and devotion to duty. He has proved himself to be a brilliant fighting pilot. Under his able and determined leadership his flight has engaged and accounted for many enemy machines, he himself being personally responsible for many of these.

A Second Bar to the Distinguished Service Cross.

Lt. (temp. Capt.) T. F. Le Mesurier, D.S.C., R.A.F.

For gallantry and consistent good work. He has at all times displayed the utmost gallantry in action, and by his determination and skill has set a very fine example to the pilots of his squadron. On April 23rd, 1918, in spite of bad weather conditions, he successfully dropped bombs on the Ostend Docks from a height of 800 ft. amidst very intense anti-aircraft and machine-gun fire. He also made valuable observations. He has taken part in many bomb raids, and has destroyed or driven down out of control several enemy machines.

Air Ministry, June 21st.

R.A.F.—The follg. temp. appts. are made at the Air Ministry:—Staff Officer, 2nd Cl. (S.)—Lt. (temp. Capt.) D. C. James, and to be temp. Maj. while so empld., vice Capt. (temp. Maj.) G. S. Peacock, June 6th.

Staff Officers, 3rd Cl.—And to be temp. Capts. if not already holding that rank (S.):—Sec. Lt. (temp. Capt.) A. W. Rippon, April 1st; Sec. Lt. D. L. C. Evans, vice Lt. (temp. Capt.) F. A. Barton, April 24th; Sec. Lt. R. H. Smyth, vice Lt. (temp. Capt.) D. C. James, June 5th.

The follg temp. appts. are made:—Staff Officers, 1st Cl. (Air).—Maj. (temp. Lt.-Col.) P. C. Maltby, D.S.O., and to retain his temp. rank whilst so empld, May 1st; Maj. R. Hilton-Jones, and to be temp. Lt.-Col. while so empld., June 3rd.

Staff Officers, 2nd Cl.—Lt. (temp. Capt.) C. Death, and to be temp. Maj. while so empld, April 1st.

Staff Officers, 3rd Cl.—And to be temp. Capts. whilst so empld. if not already holding that rank (Q.):—Sec. Lt. (Hon. Lt.) E. Vevers, May 13th (P).—J. Robertson (temp. Capt., Gen. List), and is granted a temp. commn. as Capt., June 3rd; Lt. H. Lawson, June 8th. (Air).—Capt. D. L. Cox, June 5th.

Flying Branch.—The follg. Lts. (Hon. Capts.) to be temp. Capts. while empld. as Capts. (A. and S.):—W. L. Anderson, D.S.C., C. H. Keith, C. R. Morrish, D.S.C, E. R. Murray, May 1st; H. C. Sootheran, June 3rd.

Lts. to be temp. Capts. while empld. as Capts. (A. and S.):—V. F. Jaynes, June 12th; C. F. Horsley, M.C., June 13th; J. Gray, R. J. Rodwell, June 15th.

Sec. Lt. (Hon. Maj.) F. W. K. Davies to be temp. Capt. while empld. as Capt. (A. and S.), May 11th.

The follg. temp. Lts., Obsr. Officers, to be temp. Lts. (A. and S.):—J. B. Pierce, April 27th; W. K. McMillan, May 6th; R. F. Hill, M.C., May 14th; A. R. Gibson, C. H. Jordan, May 15th; J. E. L. Skelton, May 16th; W. S. Cowper-Coles, May 18th.

Temp. Lt. (Hon. Maj.) J. A. C. Wright, from Obsr. Officer, to be temp. Lt. and to be Hon. Maj., May 17th.

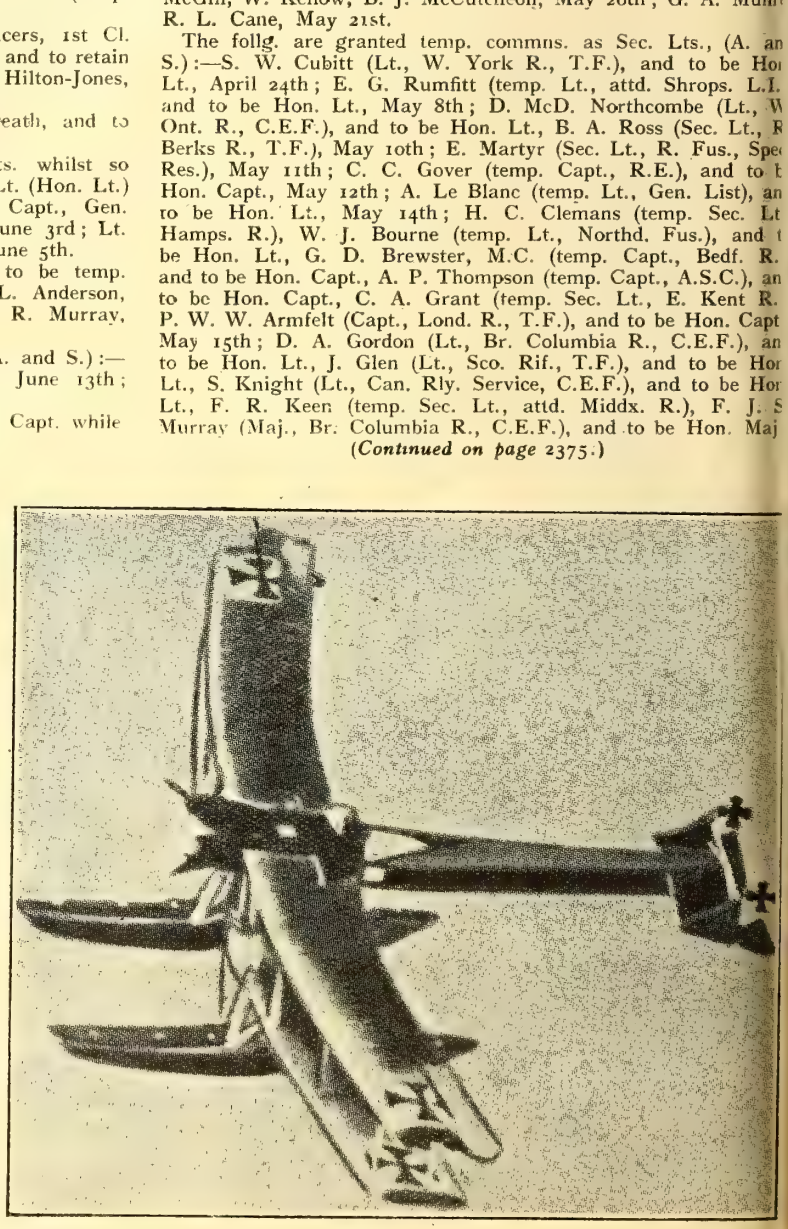
Temp. Sec. Lt. H. W. Arnott (Tech.) to be temp. Sec Lt. (A. and S.), May 17th.

The follg. Sec. Lts. (late Spec. Res., R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts. (A. and S.):—R. Russell, May 10th; W. J. Barber, May 19th; T. D. H. Alderton, May 20th.

The follg. temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts. (A. and S.):—E. Mulcair, April 1st; J. K. Stewart, J. R. Quinn, April 2nd; P. S. Manley, April 4th; L. J. Weatherall, April 5th; W. Campbell, April 7th; F. J. Russell, C. E. Gregory, A. H. Freed, April 8th; E. G. Jones, April 13th; L. W. Savidge, H. N. Thornton, A. B. MacPherson, April 26th; S. Levett, April 28th; J. F. C. Oliver, April 30th; G. L. Winterbottom, S. B. Wright, May 4th; A. T. Dunlop, C. W. Frasier, May 6th; J. R. Brown, C. Brooks, E. C. Clarke, H. J. C. Seymour, May 8th; J. B. G. Bradley, A. Lewis, M. Tallentire, D. Oxley, C. A. Crichton, May 9th; F. C. Wiltshaw, H. F. V. Battle, R. S. McKenna, A. A. S. Milne, H. L. McLellan, P. Phillips, May 10th; H. G. Marsay, R. J. T. Wray, May 11th; A. L. Pearce, T. C. Clarkson, E. Peacock, C. O. Frost, L. S. Morck H. H. Palmer, J. Farquhar, May 12th; L. C. Holliday, H. Rae, G. E. Scott, H. R. Abey, H. W. Smith, May 13th; H. Wheat, J. Owen, J. C. G. Drummond, H. Townley, G. V. Kitson, G. Read C. S. Gregg, J. K. Hill, S. Rendle, W. T. Leonard, R. F Wimbush, F. H. H. Biddle, A. S. Colley, W. W. Gyles, S. G. T Spear, W. A. Warwick, E. A. C. Britton, May 14th; F. Findlay J. A. Watt, D. W. Pugh, W. H. Bland, W. H. Gil son, J. A. Mitchell, A. N. Abbott, L. Thompson, S. S. Snelling J. Wallace, J. S. Haigh, E. G. Reynolds. H. Howarth, P. V Frederichsen, J. S. Swales, G. W. T. Latimer, E. O. Champagn S. E. Alexander, C. A. J. Goodfellow, W. F. Jaggs, N. Davie F. J. Shearer, T. Peacock, H. E. King, S. S. George, J. C Kershaw, R. Hawkins, May 15th; T. Warburton, H. F. Rec mond, H. Dodd, J. H. Gidman, J. J. Mordecai, W. O. Gol thorpe, A. O. Farmer, J. Rathbone, E. M. Sutton, H. Walke L. T. Bird, V. C. Roxmouth, J G. Webster, D. Mumfor W. G. F. Grant, H. G. R. Boyt, A. Russell, W. N. Wilso W. J. Kelsey, J. C. Ivens, J. H. Stringfellow, J. B. Lacy, L. V Evans, T. R. Adair, H. Butterworth, H West, W. S. Daile F. Wallis, C. B. S. Gilliat, A. N. Jones, O. V. Judkins, W. F Maxted, R. Niven, L. C. Andrews, May 16th; R. P. Walle J. M. Walker, L. C. Scroggie, P. J. A. Fleming, P. L. Lowe hoff, R. U. Fuller, W. Campbell, A. A. Boothe, R. J. Dave O. Price, G. W. Taylor, I. L. Bourke, G. E. C. Wisdom, F Northrop, R. J. Morgan, G. T. Olmstead, J. W. Page, C. C Bevington, M. F. Poulter, J. H. W. Wilcox, E. S. Morrison, I McGibbon, J. C. Lawrence, J. Pughe-Jones, F. Fraser, F. Allso W. A. Hall, W. S. Weeks, E. R. Wallington, May 17th W. H. E. Graham, A. Roots, J. W. Pickering, H. W. Goldsack C. B. Sanderson, G. A. Walker, F. R. Greenwood, G. H. Waddu J. P. Ferreira, E. C. Crossley, T. C. Stuart, G. W. Gan G. Randell, E. Cotton, May 18th; H. E. B. Holden, T. I Lysaght, P. G. Troughton, G. E. Shipp, L. H. Parsons, R. Loughleen, May 19th; H. B. Hewat, D. V. MeLeod, J. Massey, H. A. Townsley, D. M. Fleming, N. Cook, W. W McGill, W. Kellow, B. J. McCutcheon, May 20th; G. A. Munr R. L. Cane, May 21st.

The follg. are granted temp. commns. as Sec. Lts., (A. an S.):—S. W. Cubitt (Lt., W. York R., T.F.), and to be Hon Lt., April 24th; E. G. Rumfitt (temp. Lt., attd. Shrops. L.I. and to be Hon. Lt., May 8th; D. McD. Northcombe (Lt., W Ont. R., C.E.F.), and to be Hon. Lt., B. A. Ross (Sec. Lt., R Berks R., T.F.), May 10th; E. Martyr (Sec. Lt., R. Fus., Spe Res.), May 11th; C. C. Gover (temp. Capt., R.E.), and to b Hon. Capt., May 12th; A. Le Blanc (temp. Lt., Gen. List), an to be Hon. Lt., May 14th; H. C. Clemans (temp. Sec. Lt Hamps. R.), W. J. Bourne (temp. Lt., Northd. Fus.), and t be Hon. Lt., G. D. Brewster, M.C. (temp. Capt., Bedf. R. and to be Hon. Capt., A. P. Thompson (temp. Capt., A.S.C.), an to be Hon. Capt., C. A. Grant (temp. Sec. Lt., E. Kent R. P. W. W. Armfelt (Capt., Lond. R., T.F.), and to be Hon. Capt May 15th; D. A. Gordon (Lt., Br. Columbia R., C.E.F.), an to be Hon. Lt., J. Glen (Lt., Sco. Rif., T.F.), and to be Hon Lt., S. Knight (Lt., Can. Rly. Service, C.E.F.), and to be Hon Lt., F. R. Keen (temp. Sec. Lt., attd. Middx. R.), F. J. S Murray (Maj., Br. Columbia R., C.E.F.), and to be Hon. Maj

(*Continued on page 2375.*)



The German Freak Seaplane viewed from another machine in the Air.



The Warrior of old fought behind a shield of Steel—
The Modern Knight of the Air relies upon a shield of——

'TRIPLEX'

Unsplinterable Safety Glass

Catalogue Mailed on Request:—

The 'TRIPLEX' SAFETY GLASS Co., Ltd.
(Reginald Delpech, Managing Director),
1, ALBEMARLE STREET, LONDON, W.1.
Telephone—Regent 1340.
Telegrams—"Shatterlys, Piccy, London."

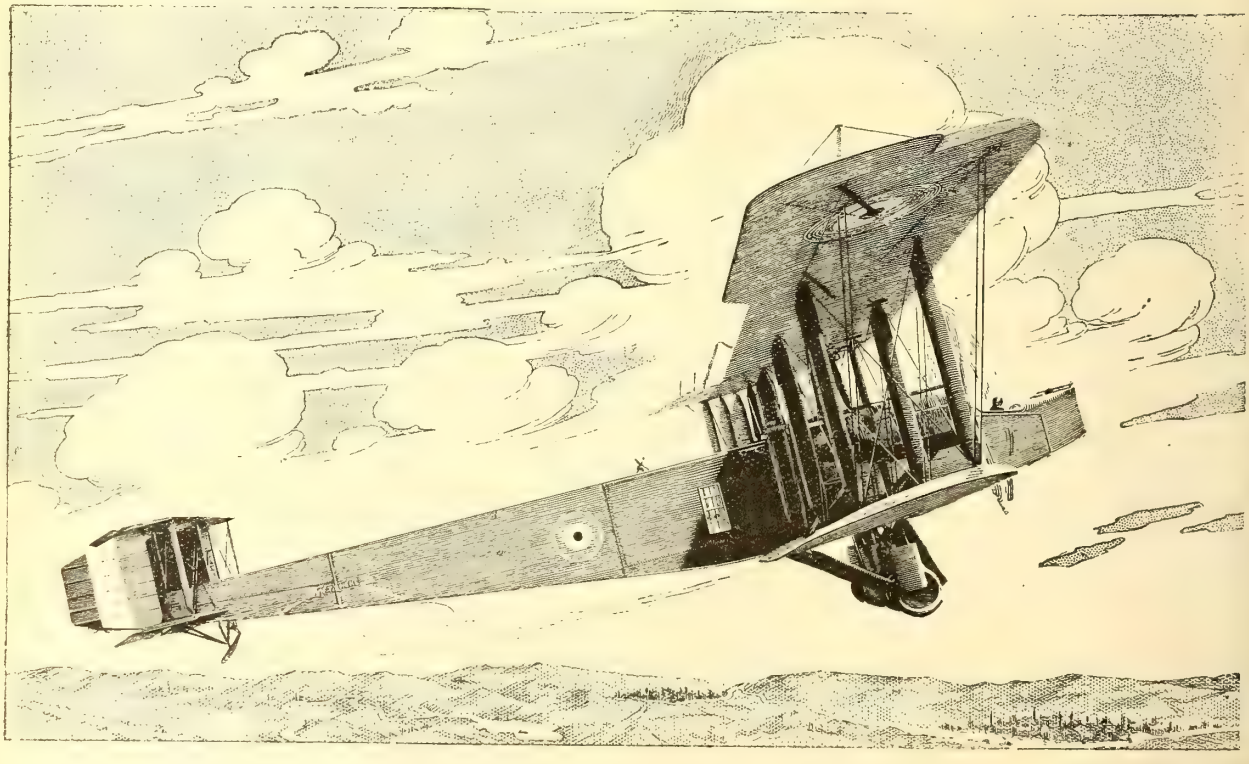
SUNBEAM-COATALEN AIRCRAFT MOTORS

WHAT THE "CAR" *says*:—

"IT may be said, without giving offence to the authorities, that the fitting of the big Sunbeam-Coatalen power units to the Handley-Page bombing machine has given us a lead in the air approximately equal to that bestowed on our Naval work by our super-Dreadnoughts and the latest 'Hush-hush' Ships."

APRIL 24th, 1918.

THE SUNBEAM MOTOR CAR CO., LTD., WOLVERHAMPTON.



A Handley-Page Bombing Machine fitted with Sunbeam-Coatalen Aircraft Engines.

WOODSIDE ENGINEERING COMPANY, LTD.
POSSILPARK, GLASGOW.

AEROPLANE TIERODS

IN

STREAMLINE AND ROUND SECTIONS

COMPLETE WITH

UNIVERSAL OR FORK JOINTS

LARGE STOCKS.

PROMPT DELIVERY.

Telephones.
WORKS: 1495 Douglas (2 lines.)
OFFICE: 3456 Central (3 lines.)
(Private Branch Exchange.)
Telegrams: "FUSELAGE," GLASGOW

Registered Office
50 WELLINGTON STREET
GLASGOW.

CONTRACTORS TO
HIS MAJESTY'S WAR OFFICE

Messrs. Gordon Watney & Co. Ltd

AERONAUTICAL AND
GENERAL ENGINEERS

WEYBRIDGE

Telephones WEYBRIDGE 550 (7 lines), Telegrams: "MERCEDES, WEYBRIDGE."

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

AERONAUTICAL ENGINEERING
SUPPLEMENT TO "THE AEROPLANE"
INCORPORATING AIRCRAFT ENGINEERING, AERODYNAMICS, AND MATTERS PERTAINING TO THE AERONAUTICAL ENGINEER AND THE AIRCRAFT TRADER

THE AEROPLANES OF THE ROYAL AIRCRAFT FACTORY.

Now that the daisies have begun to grow over the grave of the Royal Aircraft Factory and, phœnix-like, the Royal Aircraft Establishment has arisen from its ashes and flapped its miniature wings over the tomb of its corpulent father, it seems fitting that a review of the aeroplanes produced by the deceased though unlamented institution should be attempted.

The courtesy of the Technical Department of the Air Ministry makes it possible to exhibit to the readers of THE AEROPLANE a collection of photographs of different aeroplanes, which though not a complete catalogue of the great procession of types which have passed out of the Royal Aircraft Factory, is sufficiently representative of the genus.

THE FONS ET ORIGO.

The Royal Aircraft Factory, like Rome, was not built in a day, and, unlike Rome, was not founded deliberately by a Romulus. It simply happened.

There existed at the commencement of the 20th century a certain Balloon Company, R.E., at Farnborough, whose duty in life was to control all the aerostatic appliances of the British Army, the "all" representing a few spherical balloons of various sizes.

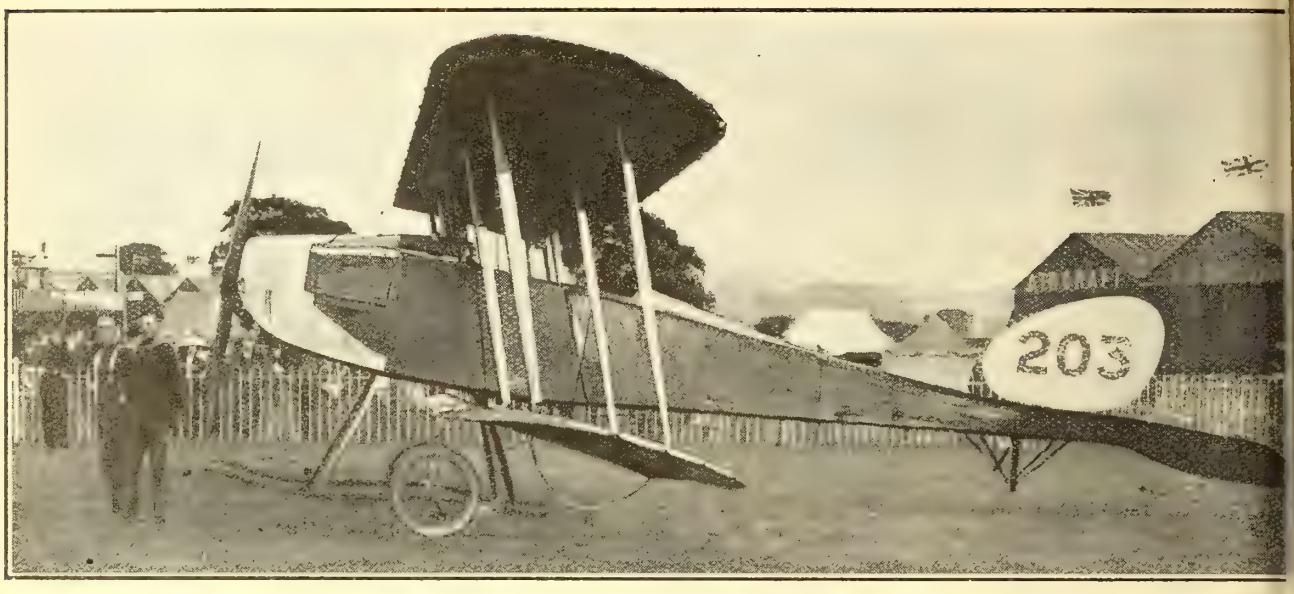
A few years later when the British Army deigned to associate itself with an airship or so, the Balloon Company was placed in charge of the self-propelling sausage balloons, and later still, when aeroplanes of weird structure were purchased from France the Balloon Co., R.E., once more assumed the glory and the danger of the new acquisitions.

The original establishment and the original name both outgrew their capacity, so additional sheds, etc., were built and the outfit was first called the Army Aircraft Factory, and in process of time the Royal Aircraft Factory.

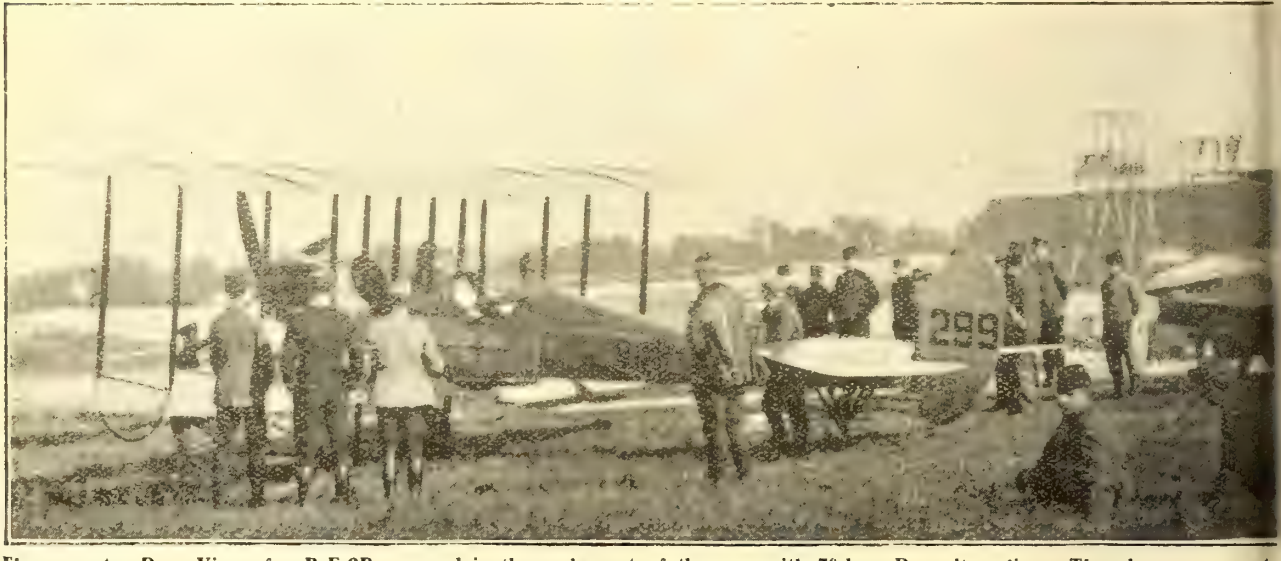
Also the control was placed in civilian hands and Mr. Mervyn O'Gorman (now Lt.-Colonel, C.B.) became superintendent.



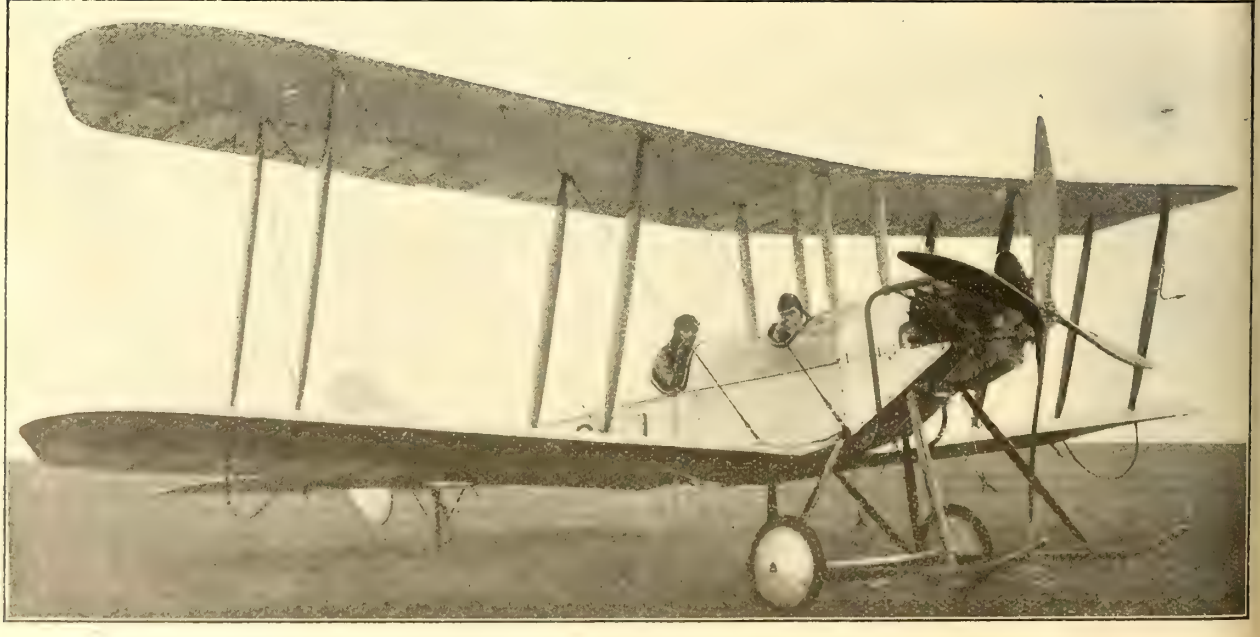
Side View of the original B.E.2 Biplane, with 70-h.p. Renault engine, at the Military Trials of 1912.



Side View of the B.E.3, which with minor variations or with engines of different powers and altered cowls became the B.E.4 and the B.E.8, and was generally known as the "Bloater" or "Goldfish."



Three-quarter Rear View of a B.E.2B, as used in the early part of the war with 70-h.p. Renault engine. The planes were not staggered and it was not inherently stable.



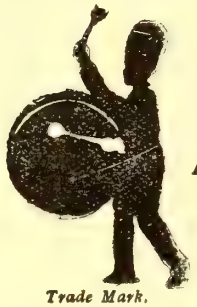
Three-quarter Front View of the early type B.E.2C, with 70-h.p. Renault engine and long skids to the undercarriage. The planes were heavily staggered and it was inherently stable.

EMAILLITE

NON-POISONOUS

AEROPLANE DOPE.

THE ORIGINAL AND STILL THE PREMIER.

AS TIGHT  AS A DRUM.

Trade Mark.

THE BRITISH EMAILLITE CO., LTD.,

Contractors to the Air Board.

Registered Offices:

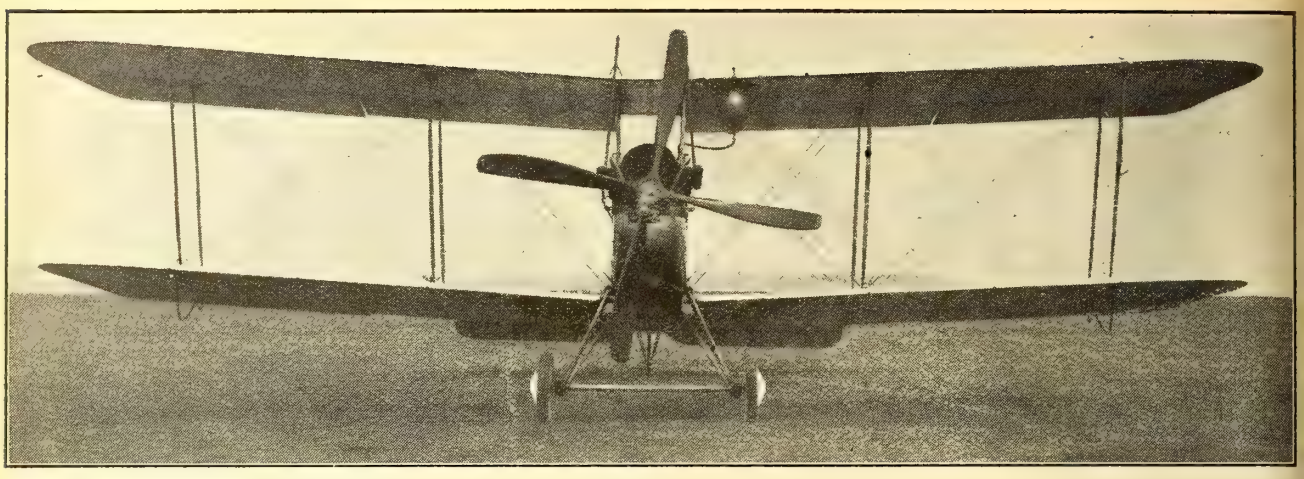
30, Regent Street, Piccadilly, S.W.1

Wire—"Ridleypren Piccy, London."
" Phone—280 Gerrard

Also at

5, Hythe Road, Cumberland Park, Willesden Junction, N.W.10.

Telephone—Willesden 2346 & 2347.



Front View of the B.E.2D Biplane. The protuberance under the upper plane is a gravity tank. The planes were of equal span, and the ailerons were operated by cables.

Various experiments were made with privately built aeroplanes and with one or two quaint structures compiled at the R.A.F., but not until 1912 was an aeroplane produced which really flew.

Then, with something approaching suddenness, and with a tinkling of cymbals, if not with the booming of guns, came forth in the summer of 1912 a tractor biplane with a four-bladed airscrew, a two-seater, which, taking part *hors concours* in the British Military Aeroplane Competition, was supposed to represent the quintessence of contemporary design.

As a matter of fact, the staff of the Royal Aircraft Factory had good reason to be proud of its baby, which beat all the other fledgling aeroplanes in the competition, except that of the late Mr. S. F. Cody, whose big machine was before its time in the matter of engine power.

Taking everything into consideration this R.A.F. tractor biplane, which was designed by Mr. (now Captain) Geoffrey de Havilland, now chief designer to the Aircraft Manufacturing Co., Ltd., was probably the best machine present at the trials from a general military point of view. The ultimate trouble was that, like Peter Pan, it never grew up, or rather its growth was stunted in relation to its age, rather as if it had been the child of a slum instead of the cultured product of an official hot-house.

The machine in question was named the B.E. biplane, which was construed into "Blériot Experimental" because M. Louis Blériot was officially regarded as having evolved the tractor type aeroplane.

With Blériot shaped wings, Wright type wing bracing, a Deperdussin fuselage, more or less, a Nieuport tail-plane and a Renault motor, and the general lay-out of an Avro, no one type could be said to be unduly favoured, but because of the aggregation of component parts which severally resembled similar parts of various trade machines, the B.E., was not an "eyeable" job, and throughout the career of the Royal Aircraft Factory the peculiarity has existed, and became more and more accentuated, so that one might say that one could recognise the average "Trade" machine by its lines, and the "Factory" machine by its angles.

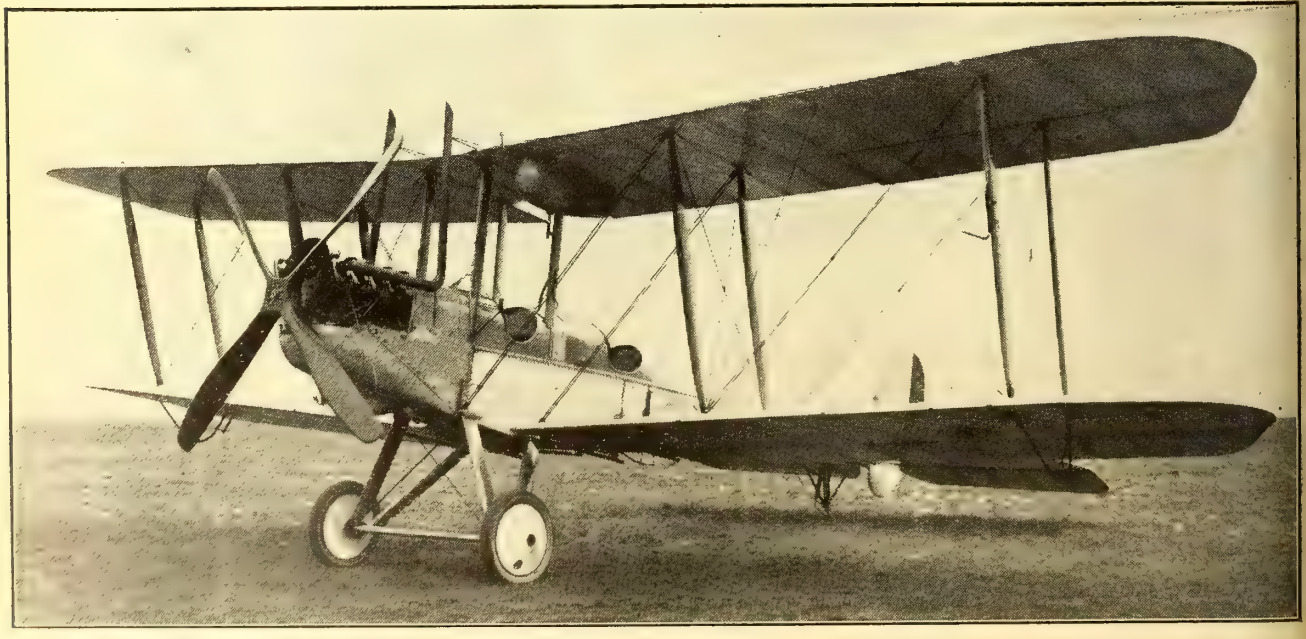
Variations.

During the next two years the B.E. biplane was produced in all manner of variations, the most noteworthy being the B.E.2b, and the B.E. 8, the latter with a Gnome engine inside a coal-scuttle cowl and a fish-like body which earned for it the name "Bloater."

Then not long before the outbreak of war there arose a craze for inherent stability, and, largely as the result of the work of the late Mr. Edward Busk, the first B.E.2c, or "Stability Jane," was evolved.

Still a two-seater tractor, her wings had been given a considerable dihedral and the warp control of the B.E. was replaced by double acting ailerons. An enormous tail, more or less rectangular in shape, and a big fin in front of the rudder, combined with proper weight distribution, made the machine perfectly stable, although her lift was somewhat impaired.

Thereafter other types, slightly modified in essentials and radically altered in details, were evolved, which, equipped with more powerful engines built by the R.A.F., strove to emulate the performances of their opposite numbers in the "Trade."



Three-quarter Front View of the B.E.2D Biplane with 90-h.p. R.A.F. engine. Planes of equal span and a cable link between the ailerons are characteristic features.

AIRCRAFT MANUFACTURING COMPANY——————LIMITED

Contractors to

War Office and Admiralty

London Office

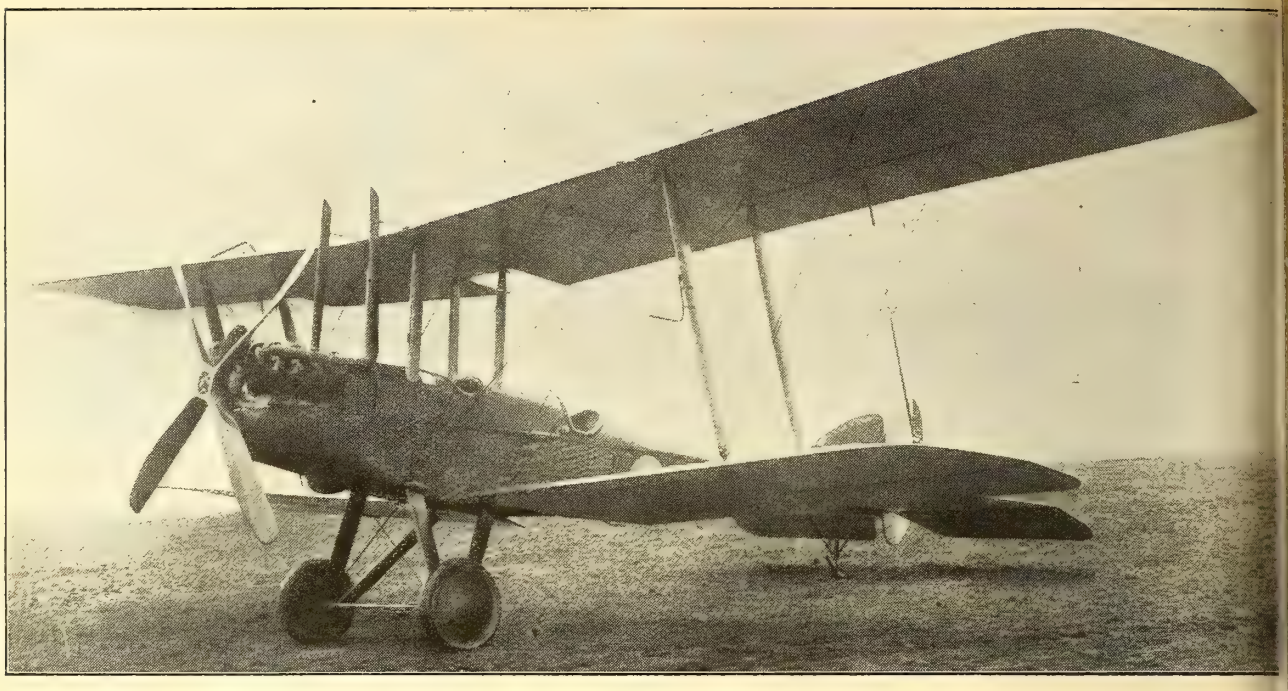
27, BUCKINGHAM GATE, S.W.1.

Telephone No.—Victoria 3688.

And at

HENDON, N.W.9.

Telephone No.—Kingsbury 220.



Three-quarter Front View of the B.E.2E Biplane with 90-h.p. R.A.F. engine. Note the overhanging upper planes and th slender strut between the ailerons.

Notable examples were the B.E.2d, B.E.2e and B.E.12. Many of these have been used in the war as general purpose aeroplanes, and equipped, like the White Knight, with all manner of impedimenta "because it might be useful," they earned the title of "Christmas Trees."

The first B.E. 2 had a 70-h.p. Renault engine and a single open cockpit for pilot and passenger.

The B.E.2b had separate cockpits, and a better streamlined fuselage.

The B.E. 2c was the first "stable" machine, also it had a marked forward stagger to the upper planes.

The B.E. 2d was similar to the 2c, but had a faster wing section. In this type the under-carriage skids were altogether abolished, the exhaust-pipes were carried up over the upper planes, and the machine generally was streamlined down to give increased speed. Also, the majority of the type had the 90-h.p. R.A.F. engine in place of the 70-h.p. Renault.

The B.E. 2e, differed materially from the 2d in having a single pair of interplane struts outside the centre section of the wings, and a big overhang to the upper planes, in which overhang the big ailerons were connected by a slender tubular strut to the small lower ailerons, this strut being outside the line of the interplane struts. It was designed to give more lift than the 2d, but its power-plant and fuselage were practically the same as in its predecessor.

In these machines the passenger sat in front of the pilot.

The R.Es.

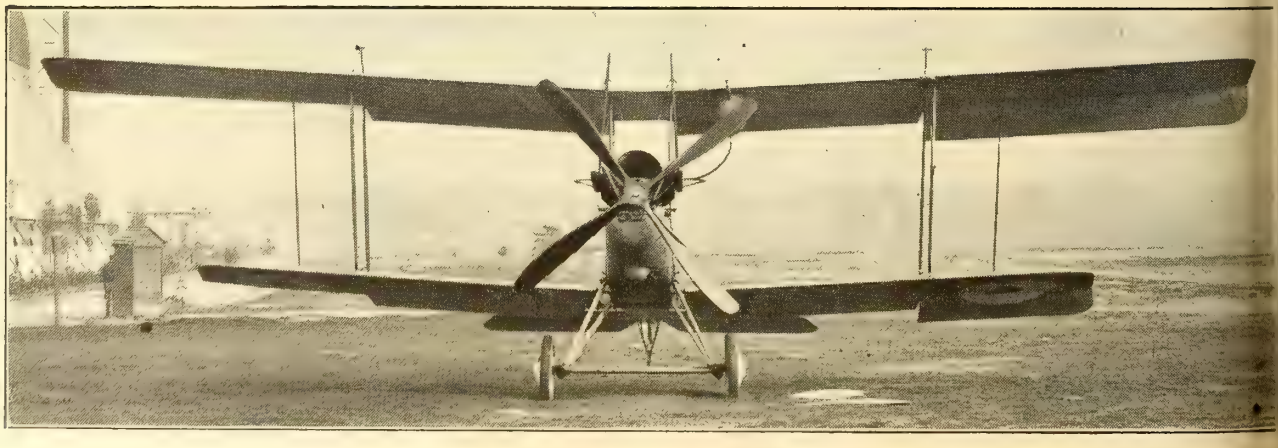
Some months before the outbreak of war a need was felt for a faster and also for a larger type of aeroplane, and the R (Reconnaissance Experimental) was produced. The first of type was a modified B.E. with a single pair of struts outside centre section on each side. This had a Renault engine 70-h.p. It was fast, but did not lift much weight. It succeeded by other variants, including the R.E. 4, which fitted with an Austro-Daimler engine of 120-h.p. This excellent climbing ability, and, piloted by Mr. Norman Spr beat the existing height record handsomely. As an aeroplan was probably the most eyeable product of the R.A.F., but some aerodynamic reason, which was very obscure at the ti it was not popular as a flying machine.

Subsequent incarnations such as the R.E. 5, R.E. 7 R.E. 8, came to light, and the later types as self-prote artillery observation machines, as night-bombers and con patrol machines did good work. These later machines have b fitted with 12-cylinder R.A.F. engines of about 130-h.p Fo considerable time, especially in 1916-17, they were very unpopu but subsequent alterations in design made them better fly machines, both pleasanter and safer. But by the time this accomplished they were already becoming obsolescent.

The "Feeplanes."

Before the exigencies of war proved the contrary, it was c sidered that the only really practical gun-carrying aeroplane the "pusher" type, such as the Henry and Maurice Farma the Vickers' "gun-'bus," and the Voisins.

The authorities of the R.A.F. chose to label the type F.E., indicating "Farman Experimental," though it might with eq



Front View of a B.E.2E Biplane with 90-h.p. R.A.F. engine. Note the single pairs of interplane struts and the slender aileron strut. Also the immense overhang of the upper planes.

GALLAY ACHIEVEMENTS

WE GUARANTEE TO CURE
OVERHEATING

Occasions arise when radiators that were eminently suitable for winter conditions are found to be inefficient in summer.

It is not necessary to slow the machine and upset the general arrangements by fitting larger radiators.

INSTALL A GALLAY BLOCK
and the trouble will cease.

We undertake an improvement of from 15 per cent. to 50 per cent. according to type of tube block previously used.

We carry out experimental work for the leading firms, all details are treated in strict confidence.

WE DELIVER TO AIR BOARD ALLOCATION

Our designers and experience are always at our customers' disposal.

GALLAY RADIATOR CO., LTD.,

L. T. DELANEY, Managing Director.

198, Great Portland Street, London, W.1.

Telephone—4826 Mayfair. Telegrams—"Galyradico, Wesdo, London."

L.T.D.


CELLON
- NON-POISONOUS -
DOPE
CELLON, LTD.,
22, Cork Street, W.1.
Telephone: Gerrard 440 (2 lines).
Telegrams: "AJAWB, Reg, London."
S.B.A.C.
GEOFFREY WATSON

THE SELSDON
AERO AND ENGINEERING
CO., LTD.

TANKS
(PETROL, OIL & WATER)

AND

TANK FITTINGS

SELSDONAERO
CROYDON

1, ALBEMARLE STREET,
LONDON, W.1.

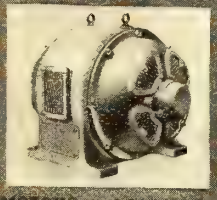
Telephones: REGENT 1181 and CROYDON 1761.
Telegrams: "SELAERO, PHONE, LONDON," & "SELAERO, CROYDON."



CABLES.



OVERHEAD LINES.



MOTORS and GENERATORS.



SWITCHGEAR and TRANSFORMERS.

JOHNSON AND PHILLIPS LTD
CHARLTON, LONDON, S.E. 7.

ELECTRIC POWER

is essential to the efficiency of your Works—it is so flexible, so easily applied to any drive, so safe to control, so readily extended.

Write to us about getting it there and setting it to work.

Birmingham 206 Corporation St. **Cardiff** 9 Park Pl. **Glasgow** 159W. George St. **Manchester** 251 Deansgate. **Newcastle** 44b Blackett St. **Portsmouth** Cleveland Rd. Gosport.

THE

GRAHAME-WHITE

AVIATION CO., LTD.

Early Delivery of **AVRO** Metal Parts.

Immediate Delivery of **De. H.** Blankings and Axles Complete.

THE LONDON AERODROME, HENDON, N.W.9.

Proprietors of the London Aerodrome and **The GRAHAME-WHITE School of Flying.**

Telegrams: VOLPLANE, HYDE, LONDON.

Telephone: Kingsbury 120 (5 lines).

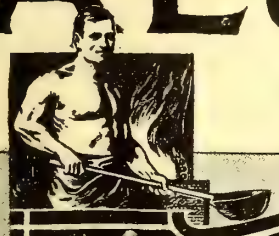
ESTABLISHED 1799.

N. GREENING & SONS, LIMITED,
16, FINSBURY STREET, LONDON, E.C.2.
& AT WARRINGTON.

MANUFACTURERS OF WIRE GAUZE FOR OIL STRAINING, ETC.
STOCKS OF ALL SIZES IN LONDON WAREHOUSE.

TELEPHONE NO. LONDON WALL 1082.
TELEGRAPHIC ADDRESS: "SETSCREW, FINSQUARE, LONDON."

ALUMINIUM CASTINGS





SAND or DIE
of Every Description
2 H·P to 600 H·P
CHILL CASTINGS for AEROPLANES A SPECIALITY
Best Metal. Good Castings. Quick Deliveries
Repairs to Aluminium Crank Cases, Gear Boxes etc., by Special Process

Telephones
3846 CITY
4879 CENTRAL

Telegrams
"KRANKASES"
ISLING
LONDON

R·W·COAN

COAN CASTS CLEAN CRANK CASES

219 GOSWELL ROAD,
LONDON,
E·C

Contractor to H.M GOVERNMENT

NOW IN A POSITION TO EXECUTE ORDERS.

ACCLES & POLLOCK LIMITED.

MANUFACTURERS OF STEEL TUBING & PRESSWORK PARTS.

The Firm with the largest Aircraft experience in Tubular Components and Steel Presswork. Send us details of your requirements.

OLDBURY, BIRMINGHAM.

Telegrams: "Accles, Oldbury."
Cod: A.B.C., 5th Edition.
Telephone: Oldbury 111 (4 Lines).

Trade Mark. ANKH *Means Long Life.*



LEWIS & TYLOR Ltd.

Cardiff and

51, Gracechurch Street, London, E.C.

MAR 65 1965

PATENT "GRIPOLY" BELTING

STRETCHLESS, HEAT AND WATER-PROOF

FOR ALL TYPES OF MACHINERY.

BANDS AND WEBBING FOR AIRCRAFT

LEATHER BALATA AND COTTON BELTING.

Contractors to H.M. Government. *On "Lloyd's Register."*

Hors Concours Membre du Jury: Brussels International Exhibition, 1910.
Grand Prix London, 1908, and Buenos Aires, 1910.

Telegrams JONAS, SHEFFIELD.

REGISTERED I C N V TRADE MARKS.

Telephone No. 4660. PRIVATE BRANCH EXCHANGE.

SIR JOSEPH JONAS, COLVER & Co., LTD.

Manufacturers of Steel of every description, including

HIGH GRADE NICKEL STEEL & FORGINGS

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels for Aircraft and Automobile Purposes

IMPORTANT SPECIALITIES:

S.S.G. A SPECIAL NICKEL CHROME GEAR STEEL.
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

S.G.W. A NICKEL CHROME STEEL IN FOUR GRADES.
Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

G.P.S. A HIGH GRADE ALLOY CASE HARDENING STEEL
For severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

SHEFFIELD.



The Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co. "Aeremnia, Piccy, London Gerrard 278 (2 lines).

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 2340 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon. "Airmanship, Hyde, London." Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne." Gosforth 500.

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd. (The Bristol Co.), Filton, Bristol. "Aviation, Bristol." Bristol 3906.

British Caudron Co., Ltd., Broadway,, Cricklewood, N.W.2. "Caudroplan, Crickle, London." Hampstead 5551.

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1092 (3 lines)

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines).

Eastbourne Aviation Co., Ltd., Eastbourne. "Aircraft, Eastbourne." Eastbourne 1176.

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London." Kingsbury 120.

Handley Page, Ltd., 110, Cricklewood Lane, N.W.2. "Hydrophid, Crickle, London." Hampstead 7420

Hooper & Co., Ltd., 54, St. James St. Piccadilly, London, S.W. "Sociable, St. James, London." Regent 612.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines)

Martinsyde Ltd., Brooklands, Byfleet. "Martinsyde, Weybridge." Woking 331; Byfleet 171

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Nieuport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London." Willesden 2455.

Norman-Thompson Flight Co., Ltd., Bognor. "Soaring, Bognor." Bognor 48.

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6. "Carbodis, London." Putney 2240-2241.

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester." City 8530-8531, Manchester.

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193.

Short Bros Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London." Regent 378.

Sopwith Aviation Co., Ltd., Kingston-on-Thames. "Sopwith, Kingston" Kingston 1088 (8 lines).

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

W. G. Tarrant, Byfleet, Surrey. Byfleet 1, 2 & 3. Tarrant, Byfleet.

Thames Aviation Works, 141, Curtain Rd., E.C.2

Vickers, Ltd., Imperial Court, Basil Street, Knightsbridge, S.W.3. "Vickerfyta, Knights, London." Kensington 6810.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London." Museum 5000.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 129.

White, J. Samuel, & Co., Ltd., East Cowes. "White, East Cowes." Cowes 3.

Whitehead Aircraft (1917), Ltd., Richmond Surrey. "Whitecraft, Richmond, Surrey." Richmond 1780-1

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks. "Aircraft, High Wycombe." High Wycombe 84.

Airships— Wimbledon 1314

Airships, Ltd., High Street, Merton.

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, 'Phone, London" Regent 378.

Aluminium Castings (Sand and Die)

Coan, R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846.

Bent Timber Parts—

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds." Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines). "Edibrac, 'Phone, London."

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3. "Poetry, Fen, London."

Buildings— Avenue 995, 996, and 7006.

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Palmer, T. W., & Co., Church Road, Merton Abbey, Surrey. Wimbledon 1313

Rubery, Owen & Co., Darlaston, South Staffs.

The Wilfley Co., Ltd., Salisbury House, London Wall, E.C.2. "Wrathless, Phone, London." City 2681-2

Cable Coverings and Cable Controls—

The Bowden Brake Co., Ltd., Tyseley, Birmingham. Acock's Green 103 & 104 Bowden, Acock's Green.

Herbert Terry & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070

Casein—

Nieuwhof, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London." Avenue 34 and 35.

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London." Central 1306-7.

Clothing—

Burberry's, Ltd., Haymarket S.W.1. Regent 2163

Dunhill's Ltd., Euston Road, N.W.1. "Dunsend, London." North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1. "New Mongo Sedist, London." Hop 83, 361, 4272.

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury." Oldbury 111 (4 lines)

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London." Hampstead 4403 and 4404.

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond. "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros., Bilston." Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1. "Tetrafree, Piccy, London." Gerrard, 2312

British Cellulose Co., 8, Waterloo Place, S.W.1. "Celluiate, London." Regent 4046.

The British Emaüite Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London." Gerrard 280

Cellon, Ltd., 22, Cork Street London, W.1. "Ajawb, Reg. London." Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London." Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries." Dumfries 281-282

The Beatty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000.

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London." Gerrard 238

Dudbridge Iron Works, Ltd. (Salmson), 87, Victoria Street, London S.W.1. "Aeroflight, Vic, London." Vic 7026.

Gordon Watney & Co., Ltd., Weybridge. "Mercedès, Weybridge." Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham. Richmond 1203

Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith." Hammersmith 1910.

Napier & Son, D., Ltd., 14, New Burlington Street, London, W., and at Acton, W. "Nitrifier, London." Gerrard 8026.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1. "Rolhead, London." Gerrard 1654 5-6.

Sunbeam Motor Car Co., Ltd., Wolverhampton. "Moorfield, Wolverhampton." Wolverhampton 085.

The Gnôme & Le Rhône Engine Co., 47, Victoria Street, S.W. "Eleven London" Walthamstow 408 (2 li

Electrical Accessories—

Belling & Co., Montague Road, Upper monton, N.18. "Belling, Edmont Tottenham 1

Johnson & Phillips, Ltd., Charlton, Lon S.E.7. "Juno, London." Central 2207, London Wall 1

Mann, Egerton & Co., Ltd., 177, Clevel Street, London, W.1. "Installing, road, London." Museum

Premier Electric Heaters, Ltd., 258, 259, 360, Bradford Street, Birmingham. "renheit, Birmingham." Midland

The Rotax Motor Accessories Co., Ltd., toria Road, Willesden Junction, N.W "Rodynalite, Phone, London." Willesden 2

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry." Coventry

Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London." Central 2207, London Wall 1

Electric Lighting and Power

E. Stanley Fardon, A.M.I.E.E., 67, Mo Street, Manchester

Johnson & Phillips, Ltd., Charlton, Lond S.E.7. "Juno, London. Central 2207, London Wall 1

Mann, Egerton & Co., Ltd., 117, Clevel Street, London, W. Museum 70 (4 lin Installing Eusroad.

Electro Platers and Met Polishers' Engineers—

W. Canning & Co., 133-137, Great Hamp Street, Birmingham. "Materials, mingham. Birmingham 3622 Central (3 lin

Enamel—

Silico Enamel Co., New Cross, London, S

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, L don, S.W.1. "Edibrac, 'Phone, Londo

Flexible Shafts—3540 Victoria (3 lin

Herbert Terry & Sons, Ltd., Reddi "Springs, Redditch." Redditch

Fluxes—

Imperial Light, Ltd., 123, Victoria St., We minster, London, S.W.1. Victoria 3 (3 lines). "Edibrac, 'Phone, London."

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot lage, Bournemouth. "Etches, Winton." Bournemouth 11

Cambridge School of Flying and Aerodrome C 308, St. Andrews St., Cambridge. "C bon, Cambridge." Cambridge 5 and 10

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavem House, London, E.C.2.

Galvanising— London Wall 573 and 61

Boulton & Paul, Ltd., Rose Lane, Norwi "Aviation, Norwich." Norwich 8

Gauges—

J. A. Prestwich & Co., Northumberland Pa

Gears— Tottenham, N.17.

Moss Gear Co., Ltd., Thomas Street, Aste Birmingham "Mosgear, Birmingham." East 4

Glue—

Cannon, B., & Co., Ltd., Lincoln. Lond Office, 110, Cannon Street, E.C "Bececolin, Cannon, London." City 12

Improved Liquid Glues Co., Ltd., Gt. Her tage Street, E (Croid.). "Excroide Wapp, London." Avenue 31

Mendine Co., 8, Arthur Street, E.C. Bank 58

Oldroyd, Wm., & Sons, Ltd., 9, Mincing La E.C

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albema Street, Piccadilly, W.1 "Shatterlys, Pic London" Regent 13.

Hack Saw Blades & Machines—

Victor Saw Works, Ltd., 2 and 3, W Street, Finsbury Circus, London, E. Vicsaw, Phone, London." London Wall 1

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 6 Southwark Street, London, S.E.1. "Kinne London." Hop 372 (2 line

Sturtevant Engineering Co., Ltd., 147, Que Victoria Street, London, E.C.4. "St tevant, London." Central 7121 (6 line

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Co mercial Wharf, Lambeth, S.E. "Gabri son, Watloo, London." Hop 7

Robert Young's Construction Co., Ltd., Canc bury Street, Essex Road London, N.1.

Instruments—

British Wright Co., Ltd., 33, Chancery La W.C.2. Holborn 13

Buyers' Guide.



...uments (Scientific, Alti-...eters, etc.)—

Cambridge Scientific Instrument Co., Ltd., Cambridge. "Instrument, Cambridge." Cambridge 642.

... & Mason, Ltd., Macdonald Road, Walthamstow, E.17. "Aneroid, Phone, London." Walthamstow 180.

...er Cloth—

Pegamoid Ltd, 134, Queen Victoria St., London. City 9704 (2 lines). Pegamoid, Cent, London.

...eto Driving Pieces—

...ert Terry & Sons, Ltd., Redditch. Springs, Redditch." Redditch 61

...etos—

M-L Magneto Syndicate, Ltd., Coventry. Corlton, Coventry." Coventry 1008-1009.

British Lighting & Ignition Co., Ltd., ...94, Tottenham Court Road, W.1. "Vicks...ag, Phone, London." Museum 430

British Thomson-Houston Co., Ltd., Lower ...ord Street, Coventry. "Asteroidal, Coven...ry." Coventry 278.

Manufacturers—

...rd, Chas., & Sons, Ltd., Birmingham ...Clifford, Birmingham." Central 42-43

...s in General— Avenue 1432

...ie, J. B., & Son, 30, St. Mary Axe, E.C.3.

... & Co., 46, Fenchurch Street, London, ...C.3. "Poetry, Fen, London." Avenue 905, 906, and 7906.

...el Mercer & Co., 198, Upper Thames ...treet, E.C.4. "Reconciled, Cannon, ...ondon." City 6342.

Parts and Fittings—

...s & Pollock, Ltd., Oldbury, Birmingham. ...Accles, Oldbury." Oldbury 111 (3 lines)

...plane General Sundries, Ltd., Fulwood ...House, Fulwood Place, High Holborn, ...W.C. "Zeppiskout, Holborn, London." Holborn 4959.

...aft Supplies Co., Ltd., Ascot House, 125, ...ong Acre, W.C.2 Upcast, Rand, ...ondon" Gerrard 276 (2 lines).

...t & Harrison, Ltd., Hythe Road, Willes...en Junction. Willesden 2207.

...ss, Jones & Bayliss, Ltd., Wolverhampton. ...Bolts and Nuts.) "Bayliss, Wolverhamp...on." Wolverhampton 1041.

...burn Aeroplane & Motor Co., Ltd., ...Mympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

...h Metal (Kingston), Ltd., Kingston-on ...Thames

...rie J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

...oard Rim and Tube Co., Lombard Street, Birmingham. Lombardic, Birmingham." Midland 211 (2 lines).

..., Egerton & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Eus...ton Road, London." Museum 70.

...atford, Fredk., Lt., Lifford, Birmingham. ..."Fremo, Birmingham." King's Norton 261.

...rtson, J. H., & Co., 1, Albemarle Street, ...London, W.1 Regent 3906.

...ry, Owen, & Co., Darlaston South Staffs.

...ey, Joseph & Sons, Ltd., Wellington, Shropshire. "Sankey, Wellington, Salop." Wellington 66.

... Pulvo Engineering Co., Ltd., 10 to 16 ...Dane Street, High Holborn, London, W.C.1. "Pulvipult, Phone, London." Holborn 410.

... Selsdon Aero & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

... Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2480.

...mpson Bros., Ltd., Bradley, Bilston. "Thompson Bros., Bilston." Bilston 10.

...ler Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

...il Shearing Tools—

...tgomery, Smith & Co., Ltd., Keynsham, near Bristol. "Ingenuity, Saltford." Keynsham 21.

...al Spinnings—

...old & Sons, Lawrence Road, Tottenham, N.15.

...ric Bolts—

...hmore Bros., Hildreth Street, Balham, S.W. Battersea 415.

...bery Owen & Co., Darlaston, South Staffs.

...ellaneous—

...erson, D., & Son, Ltd (Roofs), Belfast. "Anderson, Belfast." Belfast 4033-4034-4035.

...wden Wire, Ltd., Willesden Junction, "Bowirelim, Harles, London." Willesden 2400 (3 lines).

...tish Metal (Kingston), Ltd., Kingston-on-Thames.

...own Bros., Ltd., Great Eastern Street, E.C.1. "Imbrowned, Bethroad, London." London Wall 6300.

Herbert Frood Co., Ltd., Chapel-en-le-Frith. "Frodobrake, Birmingham." Central 793.

MacLennan, J., & Co., 30, Newgate Street, E.C.1., and at Glasgow. Tapes, Cords and Threads. City 3115

Motor Cars—

Arrol Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282.

Mann, Egerton & Co., Ltd., 379/381, Euston Road, London, N.W.1. "Manegecar, Eusroad, London." Museum 70.

Standard Motor Car Co., Coventry. "Flywheel, Coventry." Coventry 530 (4 lin.s).

Nameplates and Labels—

British Metal (Kingston), Ltd., Kingston-on-Thames

The Clegg Metal Engraving Co., Worthing. "Clegg, Worthing."

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1. "Shatterlys, Piccy, London." Regent 1340.

Parachutes—

E. R. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemalivo, Ave, London London Wall 3266-3267.

Pattern Making—

Fredk. Ward, 6, 7 and 8, Allsop Street, Upper Baker Street, W. Padd 4743.

Piston Rings—

British Chuck & Piston Ring Co., Coventry. "Rings, Coventry" Coventry 723.

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield. "Ocean, Sheffield." Sheffield 2149.

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W., & Co., 22, Pocock Street, Blackfriars Road, London, S.E.1. "Blissdon, London. Hop 4340.

Presswork—

Rubery Owen & Co., Darlaston, South Staffs

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Propellers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich." Norwich 851.

Ebora Propeller Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames. "Ebora, Kingston." Kingston 672.

Integral Propeller Co., Ltd. "Aviprop, Hyde, London." Hendon 9, Kingsbury 104.

Lang Propeller, Ltd., Weybridge. "Aerosticks Weybridge." Weybridge 520-521.

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich" Norwich 482 (4 lines)

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." 24214 Leeds

Stanley Aviation Co., 67, Kingsland Road, E.2. City 8347.

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil." Yeovil 129

Pyrometers—

The Foster Instrument Co., Letchworth, Herts. Foster Instruments, Letchworth. Letchworth 26

Radiators—

Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Galyradico, Wesdo, London." Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co. Ltd., Wakefield, England. "Cradock, Wakefield." Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lyne, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812.

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester. "Semloh, Manchester." City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch." Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345 (3 lines).

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thompson Flight Co., Ltd., Middleton, Bognor. "Soaring, Bognor." Bognor 48.

Short Bros., Rochester. "Seaplanes, Rochester." Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337.

Seats for Aeroplanes—

Bowser, E., 50 Park Lane, Leeds Leeds 21953.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rodynalite, Phone, London."

Shackles—

Willesden 2480.

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Golshel, Hounslow." Hounslow 254.

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10. "Rodynalite, Phone, London." Willesden 2840

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham. "Accles, Oldbury." Oldbury 111 (3 lines).

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Blackburn Aeroplane and Motor Co., Ltd., Olympia, Leeds. "Propellors, Leeds." Roundhay 345.

W. H. Briscoe & Co., Ltd., 51 and 52, Park Street, Birmingham. "Brisk Bham." Central 550.

British Metal (Kingston), Ltd., Kingston-on-Thames.

London Aluminium Co., Ltd., Westwood Road, Aston, Birmingham. East 497 Birmingham.

Rubery Owen & Co., Darlaston, South Staffs. S.W.1. "Flamma, Vic, London." Vic 4810.

Sheet Metal Work—

The Acetylene Corporation of Great Britain, Ltd., 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

British Metal (Kingston), Ltd., Kingston-on-Thames.

Rubery Owen & Co., Darlaston, South Staffs.

The Selsdon Aero & Engineering Co. Ltd., 1, Albemarle Street, Piccadilly, W.1. "Selaero, Phone, London." Regent 1181.

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Imperial Light, Ltd., 123 Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines). "Edibrac, 'Phone, London."

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosait, West-Cent, London." Museum 2655.

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby. "Igniter, Rugby." Rugby 235.

Ripault, Leo. & Co., Ltd. (Oleo Plugs), 64a, Poland Street, W.1. "Ripault, Reg, London." Gerrard 7758.

Springs—

Dart Spring Co., West Bromwich. "Dart, West Bromwich." West Bromwich 322.

Terry, Herbert, & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61 (3 lines).

Stampings—

Avenue 1432.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3.

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Steel—

Allen, Edgar, & Co., Ltd., Sheffield. "Allen, Sheffield." Sheffield 4607.

Firth, Thos., & Sons, Sheffield. "Firth, Sheffield." Sheffield 3230 to 3237.

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard, & Co., Birmingham. "Bernico, Birmingham." Smithwick 224.

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Dayhur, Phone, London." East 3331 (2 lines).

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines).

Tanks & Cowls for Aeroplanes

Zephyr Ventilating Co., Ltd., Tyrpiatt Road, Bristol. Telegrams—Zephyr, Bristol.

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham. "Fremo, Birmingham." King's Norton 261-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street, E.C.1. And at Glasgow. City 3115.

Timber—

Brown, R. F. & F. W., Wollaton, near Nottingham. Nottingham 1526.

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Eusquare, London." Museum 496.

Also at Market Harborough, Leicestershire. "Hoptons, Market Harborough." Market Harborough 13.

J. Owen & Sons, Ltd., 109a, Borough High Street, S.E.1. "Bucheron, London." Hop 3811 (2 lines)

BUYERS' GUIDE cont. on next page



The · Aeroplane

Acceptance and Experimental Flights—

The Prodger Isaac Aviation Co "Aeromnia, Piccy, London Gerrard 278 (2 lines)

Acetylene Welding Plant—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Aeroplane Manufacturers—

Aircraft Manufacturing Co., Ltd., Hendon "Airmanship, Hyde, London" Kingsbury 180.

Armstrong, Sir W., Whitworth & Co., Ltd., Newcastle-on-Tyne. "Armstrong Aviation, Newcastle-on-Tyne" Gosforth 500

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellers, Leeds." Roundhay 345 (3 lines)

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

British & Colonial Aeroplane Co., Ltd (The Bristol Co.), Filton, Bristol. "Aviation Bristol." Bristol 3000

British Caudron Co., Ltd., Broadway, Cricklewood, N.W.2. "Cantroplan, Crickle, London" Hampstead 5551

Central Aircraft Co., High Road, Kilburn, N.W.6. "Aviduction, Phone, London" Hampstead 4403 and 4404.

Davidson Aviation Co., Ltd., Hammersmith, W.6. Hammersmith 1092 (3 lines)

Dawson, John, & Co., Ltd., Newcastle-on-Tyne. "Dependable, Newcastle-on-Tyne." Central 2604 (2 lines)

Eastbourne Aviation Co., Ltd., Eastbourne "Aircraft, Eastbourne." Eastbourne 1176

Grahame-White Aviation Co., Ltd., London Aerodrome, Hendon. "Volplane, Hyde, London. Kingsbury 120

Handley Page, Ltd., 100, Cricklewood Lane, N.W.2. "Hydrophil, Crickle, London" Hampstead 7400

Hooper & Co., Ltd., 54, St. James St., Piccadilly, London, S.W. "Sociable, St. James, London" Regent 082

Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich" Norwich 482 (4 lines)

Marcussen & Son, Bracklands, Byfleet "Marcussen, Weybridge" Weybridge 345 Byfleet 277

National Aircraft Manufacturing Co., Ltd., 15, Drummond Crescent, Seymour Street, Euston. Museum 3373.

"Newport" & General Aircraft Co., Cricklewood, London, N.W.2. "Nieuscout, Crickle, London" Willesden 2455

Norman-Thompson Flight Co., Ltd., Bognor "Soaring, Bognor" Bognor 48

The Regent Carriage Co., Ltd., 126/132, New King's Road, Fulham, S.W.6 "Carbodies London" Putney 2240-2241

Roe, A. V., & Co., Ltd., Manchester. "Triplane, Manchester City 8530 8531, Manchester

Saunders, S. E., Ltd., East Cowes, I.O.W. "Consuta, East Cowes" Cowes 193

Short Bros., Rochester, Eastchurch and Whitehall House, S.W. "Tested, Phone, London" Regent 378

Sopwith Aviation Co., Ltd., Kingston on Thames, "Sopwith, Kingston" Kingston 1088 (8 lines)

Standard Aircraft Manufacturing Co., 28, Bow Common Lane, E. East 2823.

W. G. Tarrant, Byfleet, Surrey. Byfleet 1, 2 & 3. Tarrant, Byfleet.

Thames Aviation Works, 141, Curtain Rd., E.C.2

Vickers, Ltd., Imperial Court, Hyde Street, Knightsbridge, S.W.1 "Vickerfort, London" Kensington 680.

Waring & Gillow, Ltd., Hammersmith. "Warisen, Ox, London" Museum 5000

Westland Aircraft Works, Yeovil. "Aircraft, Yeovil" Yeovil 120

White, J. Samuel, & Co., Ltd., East Cowes "White, East Cowes" Cowes 3

Whitehead Aircraft (1917), Ltd., Richmond, Surrey "Whitecraft, Richmond, Surrey" Richmond 1780-2

Wycombe Aircraft Constructors, Ltd., High Wycombe, Bucks "Aircraft, High Wycombe." High Wycombe 84

Airships—

Wimbledon 1314

Aerships, Ltd., High Street, Merton

Short Bros., Rochester, Eastchurch, and Whitehall House, S.W. "Tested, Phone, London" Regent 378

Aluminium Castings (Sand and Die)

Coan R. W., 219, Goswell Road, London, E.C.1 "Krankases, Isling, London." City 2846

Bent Timber Parts

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euspuare, London" Museum 466

Also at Market Harborough, Leicestershire "Hoptons, Market Harborough" Market Harborough 13

Bearings (Etonia Cast Phosphor Bronze)

Yorkshire Engineering Supplies, Ltd., Wortley, Leeds. "Yes, Leeds" Central 3927.

Blowpipes (Oxy-Acetylene)—

Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1 "Flamma, Vic, London." Vic 4830.

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines). "Edibrac, 'Phone, London."

Brass Sheets for Tipping Propellers—

Pritt & Co., 46, Fenchurch Street, London, E.C.3 "Poetry, Fen, London" Museum 2655

Buildings— Avenue 995, 096, and 7006

Boulton & Paul, Ltd., Rose Lane, Norwich. "Aviation, Norwich." Norwich 851.

Palmer, T. W. & Co., Church Road, Merton Abbey, Surrey Wimbledon 1113

Rubery, Owen & Co., Darlaston, South Staffs The Willey Co., Ltd., Salisbury House, London Wall, E.C.2 "Wraithless, Phone London." City 2681-2

Cable Coverings and Cable Controls—

The Bowden Brake Co., Ltd., Tyseley, Birmingham Acock's Green 103 & 104 Bowden, Acock's Green.

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Carburettors—

Hobson H. M., Ltd., 29, Vauxhall Bridge Road, S.W. Victoria 4070

Casein—

Newsholme, Surie & Co., Ltd., 5, Lloyds Avenue, London, E.C.3. "Surico don, Fen London. Avenue 34 and 35

Celluloid (Non-Flam.)—

Greenhill & Sons, 8, Water Lane, E.C. "Greenberg, London" Central 2306-7

Clothing—

Burberrys, Ltd., Haymarket, S.W.1. Regent 2163

Dunhill, Ltd., Euston Road, N.W.1. "Dunhill, London" North 3405-6

Coloured Rags—

Joseph, A., Earl Street, London Road, Southwark, S.E.1 "New Mungo Sedist, London." Hop 83, 301, 4272

Component Parts—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (4 lines)

Central Aircraft Co., High Road, Kilburn, N.W.6 "Aviduction, Phone, London" Hampstead 4403 and 4404

P.D.V. Aircraft Co., Ltd., Princes Street, Richmond "Aeros, Richmond." Richmond 1681

Thompson Bros. (Bilston), Ltd. Bradley, Bilston, England "Thompson Bros., Bilston" Bilston 10

Cords, Tapes, and Threads—

MacLennan, J., & Co., 30, Newgate Street, E.C.1 And at Glasgow City 3115

Dopes—

British Aeroplane Varnish Co., Ltd., 166, Piccadilly, W.1 "Tetrafree, Piccy, London" Gerrard 2314

British Cellulose Co., 8, Waterloo Place, S.W.1 "Celcoate, London" Regent 4036

The British Emulsine Co., Ltd., 30, Regent Street, S.W.1. "Ridleypren, Piccy, London" Gerrard 280

Cellon, Ltd., 22, Cork Street, London, W.1. "Ajawb, Reg London" Gerrard 440.

Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Peachine, Westrand, London" Regent 3923.

Engines and Parts—

Allen, W. H., & Co., Ltd., Bedford. "Pump, Bedford." Bedford No. 1.

Arrol-Johnston, Ltd., Dumfries. "Mocar, Dumfries" Dumfries 281-282

The Beauty School of Flying, Ltd., The Broadway, Cricklewood, N.W.2. Hampstead 3000

Beardmore Aero Eng., Ltd., 112, Great Portland Street, W.1. "Beardmore, London" Gerrard 238

Dudbridge Iron Works, Ltd. (Salutson), 87, Victoria Street, London S.W.1. "Aerofight, Vic, London" Vic 7026.

Gordon Watney & Co., Ltd., Weybridge "Mercedes, Weybridge" Weybridge 550 (7 lines).

Green Engine Co., Ltd., Twickenham Richmond 1207

Gwynnes, Ltd., Hammersmith, W. "Gwynne Hammersmith" Hammersmith 1910

Napier & Son, D., Ltd., 14, New Burlington Street, London W., and at Acton, W. "Nutrifier, London" Gerrard 8026.

Rolls-Royce, Ltd., 14 and 15, Conduit St., W.1 "Rolbead, London" Gerrard 1634 5 6

Sunbeam Motor Car Co., Ltd., Wolverhampton "Moorfield, Wolverhampton." Wolverhampton 085

The Gnôme & Le Rhône Engine Co., Ltd., 47, Victoria Street, S.W., and at Walthamstow "Gnôme, London" Walthamstow 404

Electrical Accessories—

Belling & Co., Montague Road, Lower Edmonton, N.18 "Belling, Edmonton" Tottenham 422

Johnson & Phillips, Ltd., Charlton, London, S.E.7. "Juno, London" Central 2207, London Wall 7266

Mann, Egerton & Co., Ltd., 357, Euston Road, London, W.1. "Installa" Museum 7

Premier Electric Heaters, Ltd., 258, 260, Bradford Street, Birmingham, and Fenchurch, Birmingham "Premier, Midland"

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W. "Rotaxphone, London" Willesden 2480

Electric Cables—

E. Kalker & Co., Coventry. "Kalker, Coventry" Coventry 2

Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Central 2207, London Wall 7266

Electric Lighting and Power—

E. Stanley Edwards, AMIEE., 67, Victoria Street, Manchester

Johnson & Phillips, Ltd., Charlton, London, S.E.7 "Juno, London" Central 2207, London Wall 7266

Mann, Egerton & Co., Ltd., 117, Clerkenwell Street, London, W. "Installing, Euston" Museum 7

Electro Platers and Metal Polishers' Engineers—

W. Canning & Co., 133-137, Great Hampton Street, Birmingham "Materan, Birmingham" Birmingham 3622 Central 13

Enamel—

Silico Enamel Co., New Cross, London, S.E.

Flare Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibrac, 'Phone, London."

Flexible Shafts—1540 Victoria

Herbert Terry & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Fluxes—

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1. Victoria 3540 (3 lines). "Edibrac, 'Phone, London."

Flying Schools—

Bournemouth Aviation Co., Ltd., Talbot Village, Bournemouth "Etches, Winton, Bournemouth"

Cambridge School of Flying and Aerodrome Co., 308, St. Andrews St., Cambridge "Cambridge, Cambridge" Cambridge 5 and 15

Furniture (Office)—

Cooke's (Finsbury), Ltd., Finsbury Pavement House, London, E.C.2

Galvanising—

MacLennan, J., & Co., 30, Newgate Street, E.C.1 And at Glasgow City 3115

Gauges—

J. A. Prestwich & Co., Northumberland Road, Tottenham, N.17.

Gears—

Moss Gear Co., 111, Hagley Road, Birmingham "Mossgear, Birmingham"

Glue—

Cannon, B., & Co., Ltd., Lincoln, London Office, 110, Cannon Street, E.C. "Beccrolin, Cannon, London" City

Improved Liquid Glues Co., Ltd., Glue Factory, Vintage Street, E. (Croid). "Emcroid, Wipp, London" Avenue 1

Mendine Co., 8, Arthur Street, E.C. Bank 6

Oldroyd Wm., & Sons, Ltd., 9, Mincing Lane, E.C.3

Goggles—

Triplex Safety Glass Co., Ltd., 1, Albemarle Street, Piccadilly, W.1 "Shatterproof, London" Regent 1340

Hack Saw Blades & Machines—

Victor Saw Works, Ltd., 2 and 3, Fitzroy Street, Finsbury Circus, London, E.C. "Vicsaw, Phone, London" London Wall 1

Heating and Ventilating—

Chas. P. Kinnell & Co., Ltd., 65 & 65a, Southwark Street, London, S.E.1. "Kinnell, London" Hop 372

Sturtevant Engineering Co., Ltd., 147, Queen Victoria Street, London, E.C.4 "Blowing, Sturtevant, London" Central 7321

Hollow Spars—

McGruer Bentwood Hollow Spar Co., Commercial Wharf, Lamb's Conduit Street, London, W.C. "Hollospar, London"

Robert Young's Construction Co., Ltd., Canterbury Street, Essex Road, London, N.1

Instruments—

British Wright Co., Ltd., 33, Chancery Lane, W.C.2 "Wrightco, London" Holborn 6

Buyers' · Guide.



Instruments (Scientific, Altimeters, etc.)—

Negretti & Zambra, Scientific Instrument Co., Ltd., 38, Cockspur Street, Charing Cross, S.W. "Instrument, Cambridge" Cambridge 842.

Watson, W., & Sons, Ltd., 313, High Holborn, W.C. "Aneroid, Phone, London" Holborn 57 Museum 180 Walthamstow 180

Leather Cloth—

Pantasote Co., Ltd., 134, Queen Victoria St., London, E.C. (2 lines). "Pantasote, London" Pegamoid, London

Magneto Driving Pieces—

Bowden, A. & Sons, Ltd., Redditch "Bowden, Redditch" Redditch 61

Magnetos—

Ace Magneto Syndicate, Ltd., Coventry "Acemagneto, Coventry" Coventry 1008-1009.

Coventry Ignition & Lighting Co., Ltd., Coventry "Lighting & Ignition Co., Ltd., Coventry" Coventry 1008 Midland 1

Dixon Magneto Co., Ltd., Lower Ford Street, Coventry "Dixon, Coventry" Museum 430 Asteroidal, Coventry Coventry 278.

Manufacturers—

Bowden, A. & Sons, Ltd., Birmingham "Bowden, Birmingham" Central 42-43

Merchants in General— Avenue 1432

Mann, B. & Son, 30, St. Mary Axe, E.C.3

Mann, Egerton & Co., Ltd., Fenchurch Street, London, E.C. "Motors, London" Avenue 995, 996, and 7006

Marcussen & Son, 198, Upper Thames Street, E.C.4. "Reconciled, London" Cannon, City 6342.

Parts and Fittings—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles" Oldbury 111 (3 lines)

Adams & Sons, General Sundries, Fulwood Parade, High Holborn, London "Zeppiskod, Holborn, London." Holborn 4959.

Adams & Co., Ltd., Ascot House, 125, Victoria Street, Westminster, S.W.1 Upcast, Rand, London Gerrard 276 (2 lines)

Allen & Harrison, Ltd., Hythe Road, Willesden Junction Willesden 2207.

Bayliss, Wolverhampton, Ltd. (Screws and Nuts) "Bayliss, Wolverhampton" Wolverhampton 1041.

Birmingham Aeroplane & Motor Co., Ltd., Olympia, Leeds "Propellors, Leeds." Roundhay 345 (3 lines)

Brown, W. (Kingston), Ltd., Kingston-on-Thames

Brown, W. J. & Son, 30, St. Mary Axe, E.C.3 Avenue 1432

Brown Tube and Rim and Tube Co., Lombard Street, Birmingham Lombardic, Birmingham" Midland 211 (2 lines).

Bryan Donkin & Co., Ltd., 177, Cleveland Street, London, W.1. "Installing, Euston" Museum 70

Bunnett, Fredk., Ltd., Lifford, Birmingham "Bunnett, Birmingham" King's Norton 261.

Burton, J. H., & Co., 2, Allemarle Street, London, W. Regent 3906

Cope, W., & Co., Darlaston South Staffs

Crompton & Sons, Ltd., Wellington, Salop "Sankes, Wellington, Salop" Wellington 17

Crossley Engineering Co., Ltd., 10 to 16, Great Russell Street High Holborn, London, W.C.1. "Crossley, London" Holborn 410

Dixon, Vero & Engineering Co., Ltd., 2, Albemarle Street, Piccadilly, W.1. "Dixon, Motor, London." Regent 2181.

Eclipse Motor Accessories Co., Ltd., Victoria Road, Willesden Junction N.W.10 "Eclipsite, Phone, London" Willesden 2480.

Elliott Bros., Ltd., Bradley, Bilston "Thompson Bros., Bilston" Bilston 10

Elliott Engineering Co., Ltd., Old Oak Common Lane, Willesden Junction, N.W.10.

Metal Shearing Tools—

Evans, Smith & Co., Ltd., Keynsham, Bristol "Ingenuity, Saltford" Keynsham 21

Metal Spinnings—

Fentons, Sons, Lawrence Road, Tottenham, N.15

Nuts & Bolts—

Fentons Bros., Hildreth Street, Balham, S.W. Battersea 415.

Fentons, Owen & Co., Darlaston, South Staffs.

Miscellaneous—

Fleming, D. A. Son, Ltd. (Roofs), Belfast "Anderson Belfast" Belfast 4033-4034-4035.

Flexible Wire, Ltd., Willesden Junction, Harlesden, Harles, London" Willesden 2400 (3 lines)

Forward (Kingston), Ltd., Kingston-on-Thames

Foster Bros., Ltd., Great Eastern Street, Shoreditch, Bethnal, London" London Wall 6300

Herbert Frood Co., Ltd., Chapel-en-le-Frith "Frobrake, Birmingham" Central 793

MacLennan, J., & Co., 30, Newgate Street, E.C.1, and at Glasgow. Tapes, Cords and Threads. City 3115

Motor Cars—

Arrol-Johnston, Ltd., Dumfries "Mocar, Dumfries" Dumfries 281-282

Mann, Egerton & Co., Ltd., 357, Euston Road London, N.W.1. "Manegerton, Euston road, London" Museum 7

Standard Motor Car Co., Coventry "Thrasher, Coventry" Coventry 330 (4 lines)

Nameplates and Labels—

British Mica, Kingston, Ltd., Kingston-on-Thames

The Clegg Metal Engraving Co., Worthing "Clegg, Worthing"

Observation Panels—

Triplex Safety Glass Co., Ltd., 1, Albert de Street Piccadilly, W.1 "Shatterlys, Piccy, London" Regent 1340

Parachutes— London" Regent 1340

E. B. Calthrop's Aerial Patents, Ltd., Eldon Street House, Eldon Street, London, E.C. "Savemairo, Ave, London" London Wall 3266 3267

Pattern Making—

Freeth, Ward, 6, 7 and 8, Whop Street, Upper Baker Street, N.W. Padd 4743

Piston Rings—

British Chuck & Piston Ring Co., Coventry "Rings, Coventry" Coventry

The Standard Piston Ring and Engineering Co., Ltd., Don Road, Sheffield "Oden, Sheffield" Sheffield 2149

Plating, Nickel Silver and Electro Tinning—

Arnold & Sons, Lawrence Road, Tottenham, N.15.

Power Presses and Dies—

Bliss, E. W. & Co., 21, Pocock Street, Blackfriars Road, London, S.E.1 "Blissdon, London" Hop 4340.

Presswork— London. Hop 4340.

Rubery Owen & Co., Darlaston, South Staffs Jerry, Hayward, & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61

Propellers—

Blackburn Aeroplane & Motor Co., Ltd Olympia, Leeds "Propellors, Leeds" Roundhay 345 (3 lines)

Boulton & Paul, Ltd., Rose Lane, Norwich, "Aviation, Norwich" Norwich 851

Ebora Propellers Co., 11 & 12, Surbiton Park Terrace, Kingston-on-Thames "Ebora, Kingston" Kingston 672

Integral Propeller Co., Ltd. "Avprop, Hyde, London" Hendon 9, Kingsbury 104

Lang Propeller, Ltd., Weybridge "Aerosticks Weybridge" Weybridge 520-521

Mann, Egerton & Co., Ltd., Norwich. "Motors, Norwich" Norwich 482 (4 lines)

Oddy, W. D., & Co., Leeds. "Airscrews, Leeds." 24214 Leeds

Stanley Aviation Co., 67, Kingsland Road, E.2 City 8347

Westland Aircraft Works, Yeovil "Aircraft, Yeovil" Yeovil 120

Pyrometers—

The Foster Instrument Co., Letchworth, Herts Foster Instruments, Letchworth Letchworth 26

Radiators—

Gallay Radiator Co., Ltd., 198, Great Portland Street, W.1. "Galvradio, Wesdo, London" Mayfair 4826.

Rigging for Aircraft—

Cradock, Geo., & Co., Ltd., Wakefield, Eng land. "Cradock, Wakefield" Wakefield 466

Rubber Tubing & Accessories—

Hancock, James Lane, Ltd., 266, Goswell Road, London, E.C.1. "Masticator, Isling, London" City 3811 and 3812

Safety Belts—

Holmes, C. H., & Son, 38, Albert Street, Manchester "Seaflob Manchester" City 4432.

Screw-driving Machines—

Russell Bros. (Redditch), Ltd., Littleworth, Redditch "Inventors, Redditch" Redditch 74.

Seaplane Manufacturers—

Blackburn Aeroplane & Motor Co., Ltd., Olympia, Leeds. "Propellors Leeds." Roundhay, 345 (3 lines)

Gosport Aircraft Co., Gosport "Flight, Gosport." Telephone No. 217

Mann, Egerton & Co., Ltd., Norwich "Motors, Norwich." Norwich 482 (4 lines).

The Norman Thomson Flight Co., Ltd., Middleton, Bognor "Soaring, Bognor" Bognor 28

Short Bros., Rochester. "Seaplanes Rochester" Chatham 627.

Supermarine Aviation Co., Ltd., Southampton. "Supermarine, Southampton" Southampton 1337

Seats for Aeroplanes—

Bowser, E., 50 Park Lane, Leeds Leeds 21953.

Searchlights and Landing Lights—

Imperial Light, Ltd., 123, Victoria Street, London, S.W.1 "Edibrac, 'Phone, London" 3540 Victoria (3 lines)

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxphone, Phone, London"

Shackles—

Willesden 2480

British Gold Shell Ring Co., Ltd., Hounslow, Middlesex. "Goldshel, Hounslow" Hounslow 254

The Rotax Motor Accessories Co., Ltd., Victoria Road, Willesden Junction, N.W.10 "Rotaxphone, Phone, London" Willesden 2840

Sheet Metal Pressings—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Arnold & Sons, Lawrence Road, Tottenham, N.15

Blackburn Aeroplane and Motor Co., Ltd Olympia, Leeds "Propellors, Leeds" Roundhay 345

British Metal (Kingston), Ltd., Kingston-on Thames.

London Aluminium Co., Ltd., Westwood Road Aston, Birmingham East 407 Birmingham

Rubery Owen & Co., Darlaston, South Staffs

Rubery Owen & Co., Darlaston, South Staffs The Shades Vic & Engineering Co., Ltd., 1, Albemarle Street, Piccadilly, W. "Selseo, Phone, London" Regent 1081

Arthur Hill & Co., Silchester Road, North Kensington, W. Park 1443.

Imperial Light, Ltd., 123, Victoria St., Westminster, London, S.W.1 Victoria 3540 (3 lines). "Edibrac, 'Phone, London"

Small Tools—

The Small Tool Supply Co., Ltd., Avenue Chambers, Southampton Row, W.C. "Prosant, WestCent, London" Museum 2655

Sparking Plugs—

Lodge Sparking Plug Co., Ltd., Rugby "Igniter, Rugby" Rugby 215

Ripault, Leo & Co., Ltd (Oleo Plugs), 6/9, Poland Street, W.1 "Ripault, Reg, London" Gerrard 7758

Springs—

Dart Spring Co., West Bromwich "Dart, West Bromwich" West Bromwich 322

Jerry, Hayward & Sons, Ltd., Redditch "Springs, Redditch" Redditch 61 (3 lines) Avenue 1432

Stampings—

Guthrie J. B. & Son, 30, St. Mary Axe, E.C.3 Arnold & Sons, Lawrence Road, Tottenham, N.15

Steel—

Allen Edgar, & Co., Ltd., Sheffield "Abra, Sheffield" Sheffield 4607

Firths, Thos., & Sons, Sheffield "Firth, Sheffield" Sheffield 3230 to 3237

Guthrie, J. B., & Son, 30, St. Mary Axe, E.C.3. Avenue 1432.

Nicklin, Bernard & Co., Birmingham "Bernico, Birmingham" Smethwick 224

Steel Stamps and Markings—

John Meerloo & Sons, Cleveland Street, Mile End, E.1. "Duyhur, Phone, London" East 3331 (2 lines)

Steel Tubes for Aeroplanes—

Accles & Pollock, Ltd., Oldbury, Birmingham "Accles, Oldbury" Oldbury 111 (3 lines)

Tanks & Cowls for Aeroplanes

Zephyr Ventilating Co., Ltd., Tyrpitt Road, Bristol. Telegrams - Zephyr, Bristol

Taper Pins—

Mountford, Fredk. (Birmingham), Ltd., Lifford, Birmingham "Fremo, Birmingham" King's Norton 201-262.

Tapes and Smallwares—

MacLennan, John, & Co., 30, Newgate Street E.C.1, and at Glasgow City 3115

Timber—

Brown, R. F. & F. W., Wollaton, near Nottingham Nottingham 1520

Hopton & Sons, George Street, Euston Square, London, N.W.1. "Hoptons, Euspuare, London." Museum 466

Also at Market Harborough, Leicestershire "Hoptons, Market Harborough" Market Harborough 13

J. Owen & Sons, Ltd., 1000, Borough High Street, S.E.1. "Bucheron, London" Hop 3811 12 lines

BUYERS' GUIDE cont. on next page

"The Aeroplane" Buyers' Guide.—*continued.*

Time Recorders—
Gledhill-Brook Time Recorders, Ltd., 26, Victoria Street, S.W.1. Victoria 1310.

Turnbuckles—
Rubery Owen & Co., Darlaston, South Staffs.
Mann, Egerton & Co., Ltd., 117, Cleveland Street, London, W. Museum 70 (4 lines).
Installing, Eusroad.

Tyres and Wheels—
The Palmer Tyre, Ltd., Shaftesbury Avenue. "Tyricord.Westcent." Gerrard 1214 (5 lines)

Undercarriages—
Thompson Bros. (Bilston), Ltd., Bradley, Bilston, England. "Thompson Bros, Bilston."

Varnishes— Bilston 10.
The British Fmaillite Co., Ltd., 30, Regent Street, S.W.1. "Ridleyprer, Piccy, London." Gerrard 280.
Clark Ingham, Robt., & Co., Ltd., Walter House, Bedford Street, Strand, W.C.2. "Pearline, Westrand, London" Regent 3923.
Harland, W., & Son, Merton, London, S.W.19. "Harland, Wimbledon 45." Wimbledon 45 and 1395.
Naylor Bros., Ltd., Southall, Middlesex. "Naylor, Southall." Southall 30.

Vices—
Hampton, C. and J., Ltd., Sheffield. "Vices, Sheffield." Attercliffe 95.

Washers— Avenue 1432.
Guthrie, J. B & Son, 30, St. Mary Axe, E.C.3.
Terry, Herbert & Sons, Ltd., Redditch. "Springs, Redditch." Redditch 61.

Watchmakers and Jewellers—
(Silver Models)—
Goldsmiths' & Silversmiths' Co., Ltd., 112, Regent Street, W.1. Gerrard 9091 (3 lines)

Welding and Cutting Plant—
Acetylene Corporation of Great Britain, Ltd., The, 49, Victoria Street, Westminster, S.W.1. "Flamma, Vic, London." Vic 4830
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Welding Repairs— N.15.
Arnold & Sons, Lawrence Road, Tottenham,
Barimar, Ltd., 10, Poland Street, W.1. "Barimar, Reg, London." Gerrard 8173.
The New Welding Co., 26, Rosebery Avenue, London, E.C.1. "Windoneeda, Holb, London Holborn 5252.
Imperial Light, Ltd., 123, Victoria Street, London, S.W.1. "Edibrac, 'Phone, London." 3540 Victoria (3 lines).

Wind Shields—
Auster, Ltd., 133, Long Acre, W.C. "Wi flector, London." Regent 59
Triplex Safety Glass Co., Ltd., 1, Albema Street, Piccadilly, W.1. "Shatterlys, Pic London Regent 13

Wire Gauze—
Greening, N., & Sons, Ltd., 16, Finsbury S London, E.C.2. "Setscrew, Finsqua London." London Wall 10
Guthrie, J. B., & Son, 30, St. Mary Axe, E.C

Wires and Cables Avenue 14
Bruntons, Musselburgh, Scotland. "Wiremi Musselburgh" Musselburgh
Cradock, Geo., & Co., Ltd., Wakefield, En land. "Cradock, Wakefield." Wakefield 4

Wirework— (3 line
Terry, Herbert & Sons, Ltd., Redditc "Springs, Redditch." Redditch

Woodworking Machinery—
Robinson, Thomas, & Son, Ltd., Rochdal "Robinson, Rochdale." Rochdale 46
Sagar, J., & Co, Ltd., Halifax. "Sawtoot Halifax." Halifax 1
Wadkin & Co., Leicester. "Woodwork Leicester." Leicester 36

AIRCRAFT COMPONENT PARTS & FITTINGS

FOR ALL TYPES OF MACHINES.

CONTROLS, EYEBOLTS, FINS, RADIATOR SHUTTERS, RUDDERS, TAIL PLANE ADJUSTING GEARS, TAIL SKIDS, TANKS, WIRING PLATES, A.G.S. BOLTS, CASTINGS & METAL FITTINGS of all descriptions.

MANUFACTURED BY

The Snercold Engineering Co., Ltd.,

HAMPTON WICK, MIDDX.

Telephone: 1153 and 1154, KINGSTON. Telegrams: "SNERCOLD," KINGSTON-ON-THAMES.

HEATING AND VENTILATION

OF DOPE SHOPS, AERODROMES, FACTORIES, OFFICES, &c.

Hot Water Supplies for Domestic and Factory Purposes.

We have Experienced Men to offer Advice and Estimates are Free.

Phone: HOP 372. Wire: "KINNELL-BOROH-LONDON."

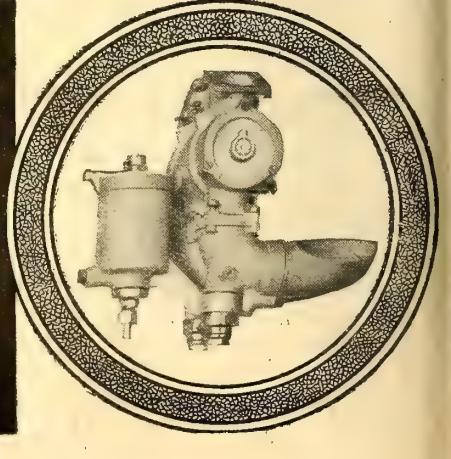
CHAS. P. KINNELL & Co., Ltd., SOUTHWARK ST., LONDON, S.E.1

Claudel-Hobson

CARBURETTERS

H. M. HOBSON, LIMITED

29, Vauxhall Bridge Road, London, S.W.1



NIEUPORT

AND

GENERAL AIRCRAFT COMPANY, LTD.

CONTRACTORS TO H.M. GOVERNMENT.

LANGTON ROAD,
CRICKLEWOOD, LONDON, N.W.2

TELEPHONE (3 LINES)—
WILLESDEN 2455

TELEGRAMS—
NIEUSCOUT, CRICKLE, LONDON

SAMUEL MERCER & CO.,

Telegrams RECONCILED CANNON, LONDON

Proprietor—S. T. MERCER.

Telephone: CITY 6342.

Metals for Aircraft.

MILD STEEL SHEETS
SPECN. S3 & 9A.
Passed & Stamped A.I.D.

BEST CHARCOAL
TINNED & LEAD
COATED.

BLACK C/R and C/A
SHEETS.

GALVD. SHEETS.



BRASS AND COPPER
SHEETS,

SOLDER. INGOT TIN.

WELDING WIRE.

COPPER BITS, ETC.

LARGE STOCKS IN OUR
OWN WAREHOUSE.

Immediate Deliveries.

Manufacturers of Solder for all purposes.

198, UPPER THAMES ST., LONDON, E.C.4.

INCREASED OUTPUT
DEMANDS
GREATER ACCOMMODATION

To meet calls for accelerated production The WILFLEY COMPANY offers its services for the provision of Factory Buildings of all types in **STEEL, FERRO-CONCRETE, BREEZE SLABS, ASBESTOS SHEETS, BRICK** and other Construction.

DESIGNS FOR COMPLETE FACTORIES IMMEDIATELY AVAILABLE.

TEMPORARY STRUCTURES A SPECIALITY.

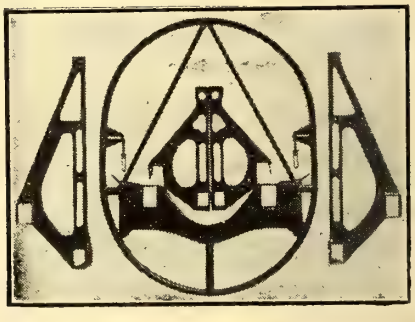
The Wilfley Company, Limited
SALISBURY HOUSE, LONDON WALL, E.C. 2.

Telegrams: "Wrathless, Phone, London." Telephones: City 2681 & 2682.

Sopwith Engine Plates in Stock, Complete Sets.
Speciality Copper Pipe Work.

WRITE FOR PRICES. THEY ARE RIGHT





ALL PARTS PASSED A.I.D. AT OUR WORKS.

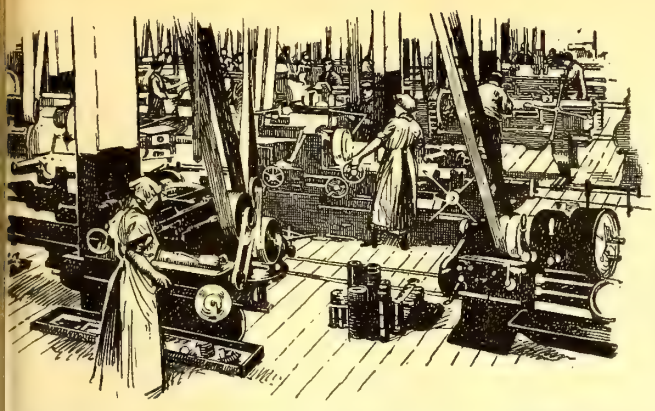
SWIFT Aviation Ltd.

Contractors to H.M. Government.

'PHONE— 762 KINGSTON.

KINGSTON

'GRAMS— "SWIFT, KINGSTON."



THE MACHINE SHOP

The Birthplace of the manufactured article demands to-day a far higher standard of organization and exactitude than ever before in the history of manufacturing.

The War with its demands has raised that standard, and the War and its demands on us have resulted in an experience which will be infinitely valuable in the days of Peace ahead.

Then will the enhanced facilities of our own machine shops be fully utilized in the execution of orders for all kinds of Auto Products which we have booked for After-War delivery.

Then will that higher standard prove its worth.

We should like to hear from you as to your probable requirements.

SUCKLING

A. SUCKLING & SONS

KINGSWAY HOUSE, ALBION ST., BIRMINGHAM.

LONDON: MORLEY HOUSE, HOLBORN VIADUCT :: E.C.1.

E474

BELLING ELECTRIC GLUE POTS

for Aeroplane and other work



List No. 38.
Price 32/-
(Spare Elements 3/6 each)

Strongly made in cast iron, the Glue container being tinned.
CAPACITY: 2 pints of glue.
LOADING: 900 watts.
3 elements, 3 heats, 3 loose connectors for attaching the cable to.
WEIGHT: 14 lbs.
For use off a power circuit.



List No. 39.
Price 35/-
(Spare Elements 3/6 each)

As above, but with a loading of only 600 watts so that it can be used off an ordinary lamp socket.
Complete with connectors, 2 yards flex, and lamp holder adaptor.



List No. 40.
Price 47/6
(Spare Elements 3/6 each)

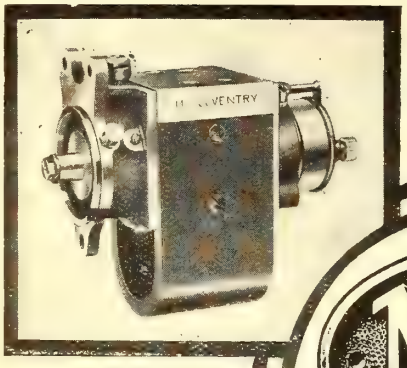
Similar to List No. 38, but fitted with a 3 heat switch on a separate panel, which is connected to the Glue Pot by 4 feet of metallic flexible tubing.
For use off a power circuit and recommended for Factory work.

All prices are subject to 50% advance.
Carriage extra on orders under £3 net value.

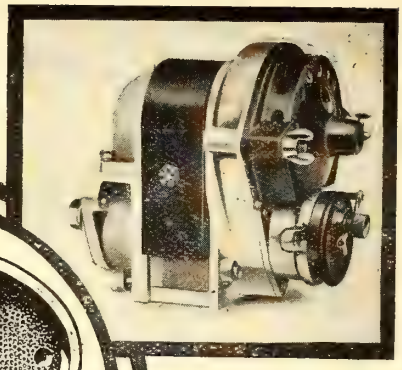
BELLING & CO.

MANUFACTURING ELECTRICAL ENGINEERS

EDMONTON, LONDON, N.18



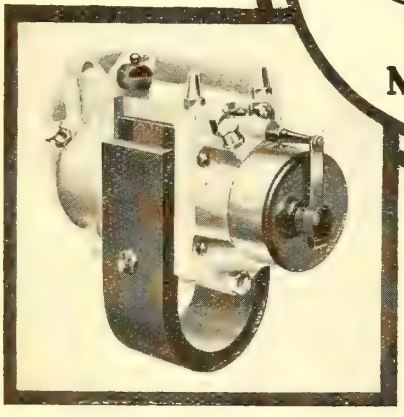
Type A.D.S



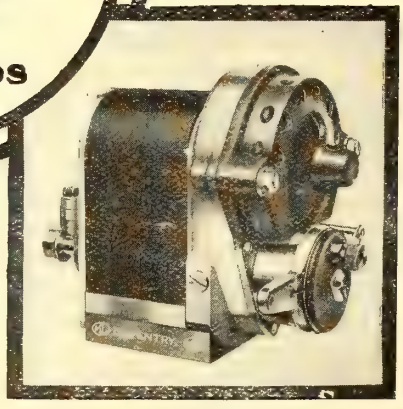
Type P.L. 7.

M-L

All-British
Magnetos



Type P.L.R.



Type P.M. 6.

All-British
Magnetos
for
Aircraft.

THE strong features of M-L All-British Magnetos which have made the aero types so successful are lightness, efficiency and effective sparking at very low speeds.

M-L Magnetos are smaller, lighter and stronger, and are more efficient than any pre-war magnetos of equal electrical output. All parts are interchangeable, "spares" can be quickly supplied.

The M-L Magneto Synd., Ltd., have been making magnetos for Aero Engines since 1914.

The illustrations show some of the M-L All-British Magnetos for Aircraft. Types A D S and P L R are designed for Rotary Engines. Types P L 6 and P L 7 are for 6 and 7 cylinder Radial Engines. Types P L 6 and P M 6 are for Vertical and V Type Engines.

The M-L Magneto Synd., Ltd.
Coventry.

Telephones—Dalston 872. London Wall 9766. Hampstead 4768. Hornsey 1105. Cardiff 2043.

Thames Aviation Works

(BURTON'S, LTD.)

THREE COMPLETE SAW MILL PLANTS,
—— FOUR OTHER FACTORIES, ——
AND TWO YEARS' EXPERIENCE.

Postal Address only:

141, CURTAIN ROAD, E.C. 2.

CONSTRUCTORS OF COMPLETE AIRCRAFT

And all kinds of WOOD PARTS, WINGS, AILERONS,
— STRUTS, LEVERS, RUDDERS, NACELLES, &c. —

Specialities—BIG STUFF and BEST WORK.

Heating & Ventilation
Installations
for
Factories
Dope Rooms
and all
requirements

ROSSER & RUSSELL Ltd
HEATING ENGINEERS
Manchester. House 37 Duke St, Oxford St W1
and Cabinet Chambers Basinghall St. Leeds.

formerly at
22 Charing Cross
S.W.

Telephone
Mayfair 5210

Telegrams
Lesorus Hammer London

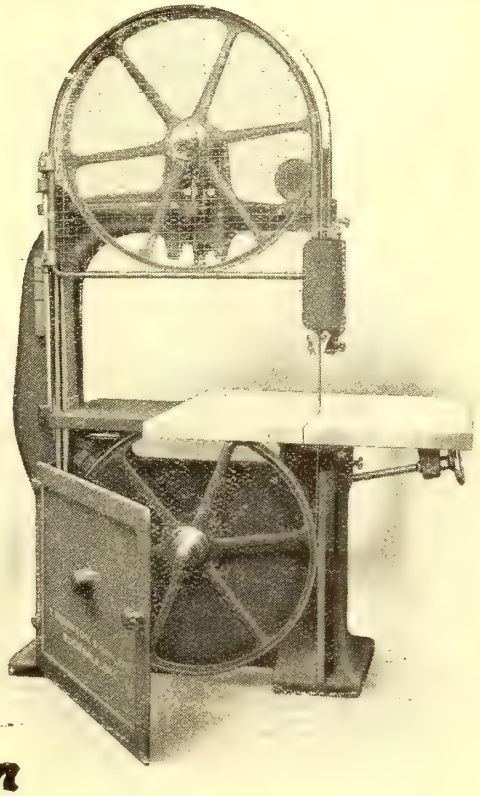
Band Sawing Machines
FOR AIRCRAFT
AND OTHER
HIGH-CLASS WORK.

SPECIAL FEATURES:

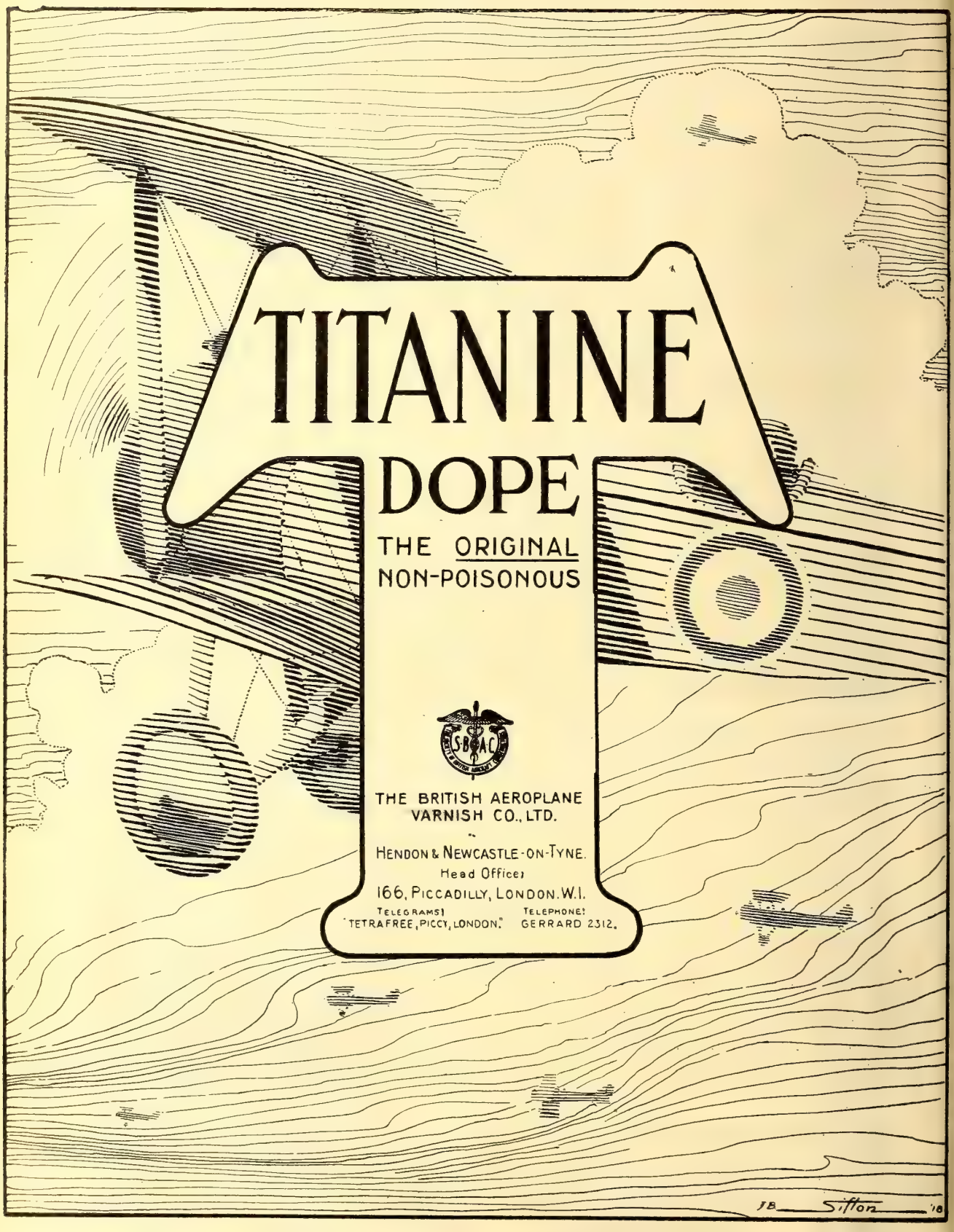
Saw Pulleys mounted in **Ball Bearings.**
Patent Straining Device which **prevents** breakage of Saws.
High Speed with accurate sawing.

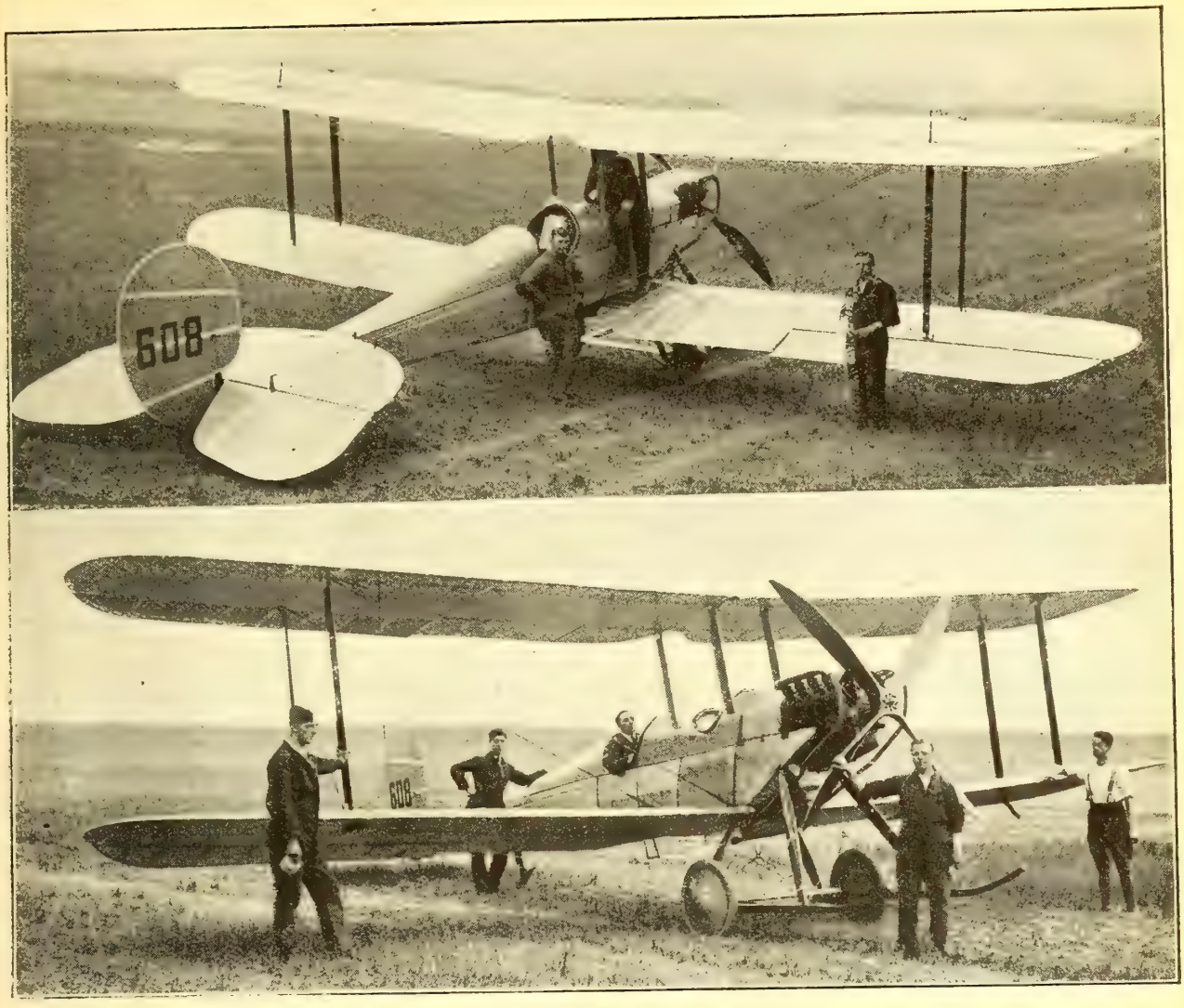
Type NO—30in. SAW PULLEYS.
Type NU—36in. SAW PULLEYS.

Write for particulars.



Thos. Robinson & Son LIMITED
ROCHDALE

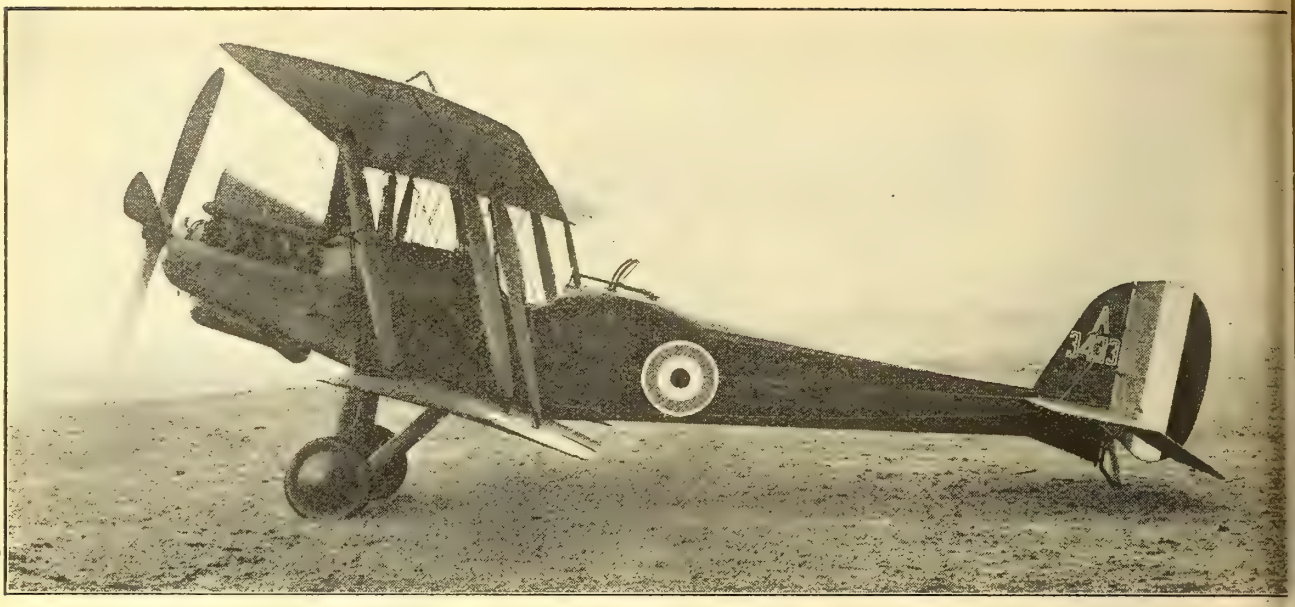

TITANINE
DOPE
THE ORIGINAL
NON-POISONOUS
SBAC
THE BRITISH AEROPLANE
VARNISH CO., LTD.
HENDON & NEWCASTLE-ON-TYNE.
Head Office:
166, PICCADILLY, LONDON. W.1.
TELEGRAMS:
"TETRAFREE, PICCY, LONDON."
TELEPHONE:
GERRARD 2312.
JB Sifton '18



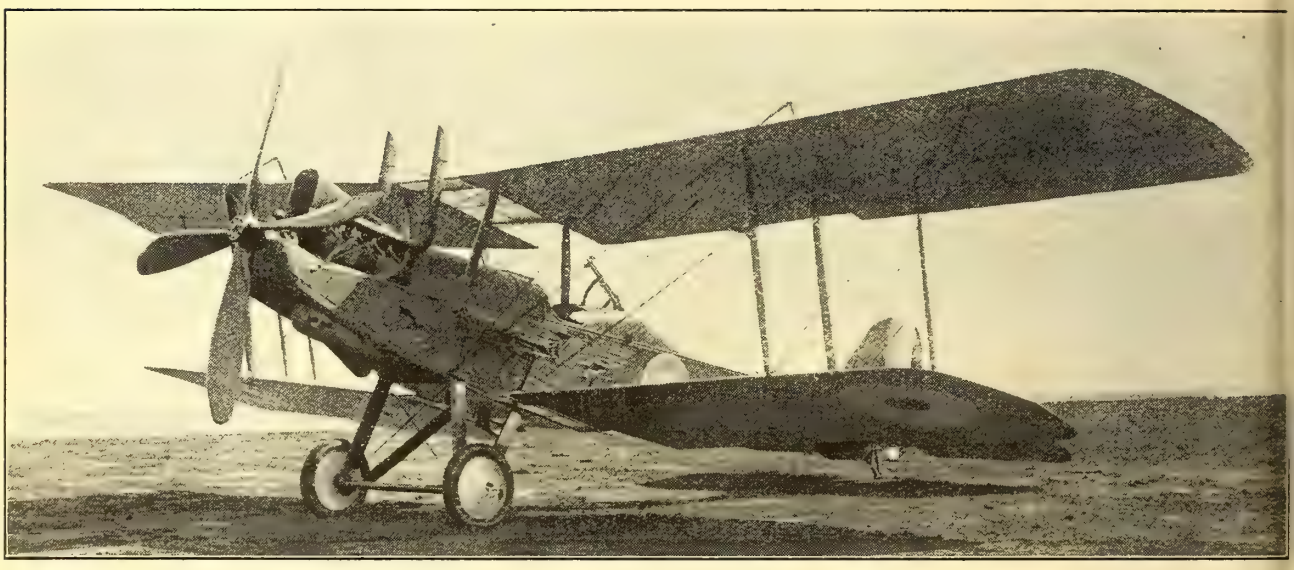
THE ORIGINAL R.E.: Three-quarter Rear and Front Views of the first R.E., built for speed early in 1914, with single pairs of interplane struts outside the centre section. The engine was a 70-h.p. Renault.



THE ALTITUDE R.E. Three-quarter Rear and Front Views of the R.E.4, with 120-h.p. Austro-Daimler engine, built in 1914.



Side View of the R.E.8 Biplane, with 130-h.p. R.A.F. engine. A gun ring is placed round the observer's seat.



Three-quarter Front View of the R.E.8 Biplane with 130-h.p. R.A.F. engine. The airscoop above the engine is a striking feature, as is the gun-ring aft.



Three-quarter Rear View of the F.E.2 Biplane, with 70-h.p. Renault engine. The lack of fin area aft, in comparison with the bull nose, is remarkable.

MANN EGERTON & Co.Ltd.

Contractors to the Admiralty, H.M. War Office, Etc.

ELECTRICAL

POWER AND LIGHTING

SPECIALISTS

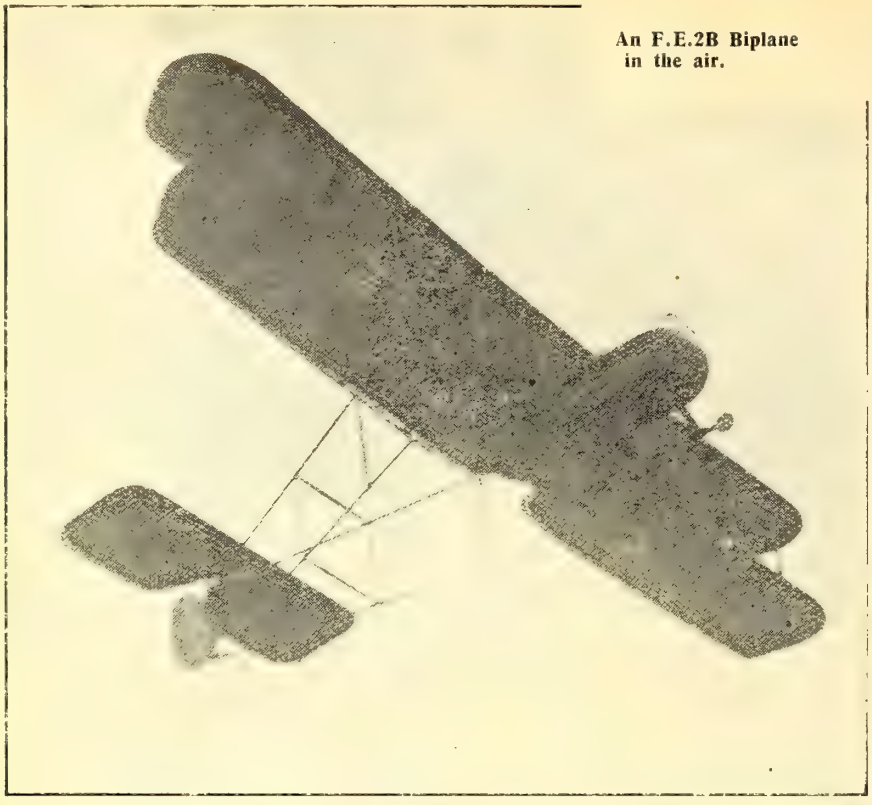
ENGINES, DYNAMOS, MOTORS, SWITCHBOARDS, CABLES, LAMPS, ETC.

FOR MUNITION FACTORIES

SUPPLIED & ERECTED AT SHORTEST NOTICE.

MANN EGERTON & Co.Ltd.

177, CLEVELAND ST., LONDON, W.1.
ALSO AT NORWICH AND IPSWICH.



An F.E.2B Biplane in the air.

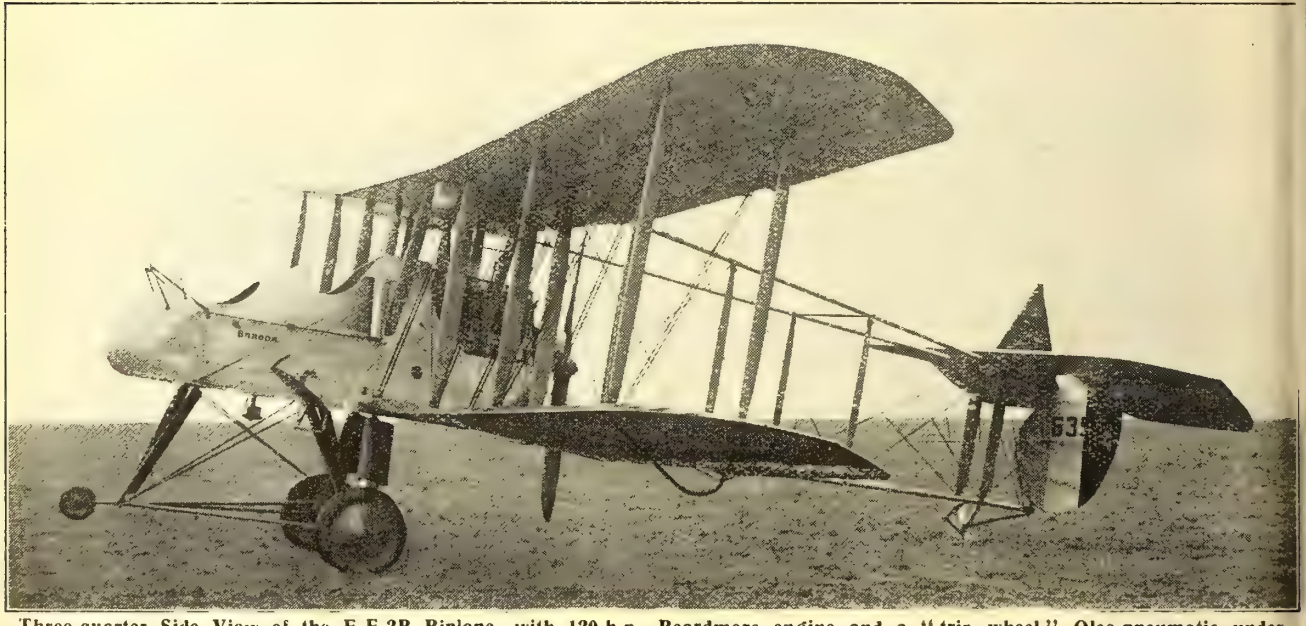
or more justice have been called t V.E. in recognition of the fact th Voisin Brothers originated the "pushe type from which the Farman veloped.

The first R.A.F. essay at the spec was, like the physiognomy of a Germ prisoner, merely "unprepossessing but the second attempt, known as t F.E.2, was frankly a calamity. It w a bull-nosed brute with a deep nacel at the rear of which was a 70-h. Renault engine driving the typic R.A.F. four-bladed airscrew. T Blériot-shaped, Wright-braced warpi B.E. type planes were retained, as al the B.E. type pear-shaped rudd hitched to Farman type tail-boom The machine evinced a tendency spin, a penchant which developed as t planes became soggy, and finally a lon foreseen accident occurred which kill the passenger and crippled the pilot.

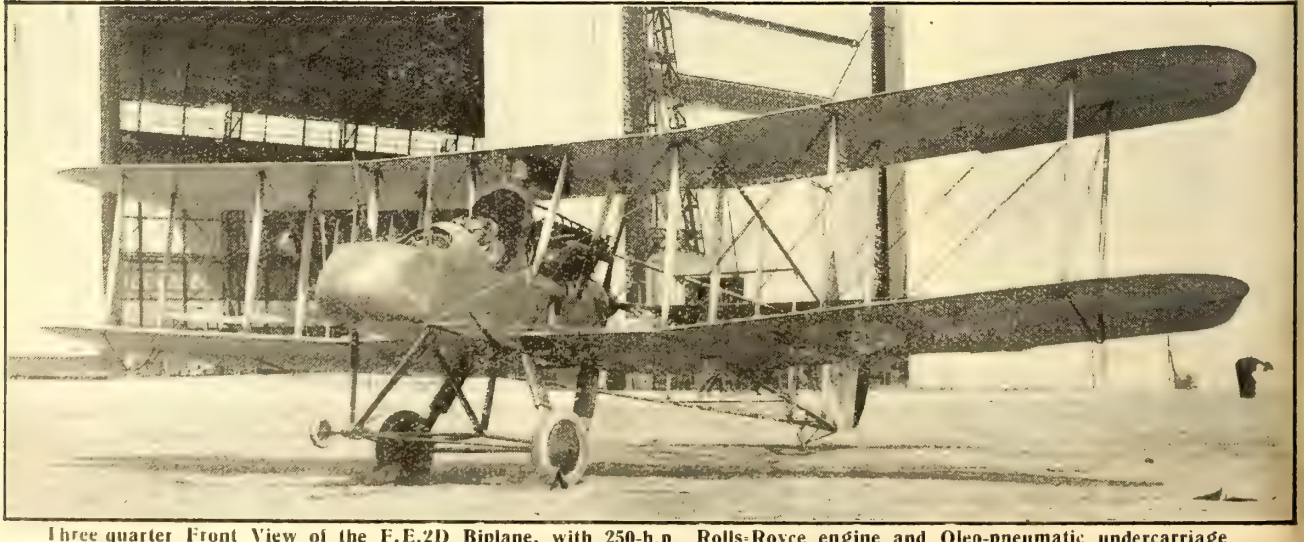
Later examples, fitted with rig wings, ailerons, Beardmore engine and Oleo-pneumatic undercarriages pe formed more satisfactorily, and we largely used at the front, first for figh ing and subsequently for nigh bombing.

The official significance of their nam was changed from "Farman Exper mental" to "Fighting Exper mental," and colloquially they hav long been called "Feeplanes."

A single-seater pusher fighter wit a monosoupape Gnome engine, c



Three-quarter Side View of the F.E.2B Biplane, with 120-h.p. Beardmore engine and a "trip wheel" Oleo-pneumatic undercarriage.



Three quarter Front View of the F.E.2D Biplane, with 250-h.p. Rolls-Royce engine and Oleo-pneumatic undercarriage.

ASCOL



IN FOUR DAYS

over 25 per cent. of the names on the "Aircraft Supplies" Mailing List were enrolled as Subscribers.

ARE YOU A SUBSCRIBER?

The Directors of The Aircraft Supplies Company, Limited, regret that, owing to the shortage of paper, it has become necessary to curtail, as much as possible, any increase in the circulation of "Aircraft Supplies," the "Ascol" House Fortnightly Stock List and House Journal. In order to enable those persons who require "Aircraft Supplies" for their everyday business to receive the journal regularly, it has been decided to issue copies to subscribers only, **on and after July 30th. The Subscription Rate for single copies is 10/- per annum, post free.** Firms engaged in the Aircraft Industry may order "Aircraft Supplies" to be sent them regularly, the subscription, in advance, to be invoiced as usual.

S·B·A·C THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

THE AIRCRAFT SUPPLIES COMPANY LTD

ASCOL HOUSE, 125, LONG ACRE, LONDON, W.C.2.

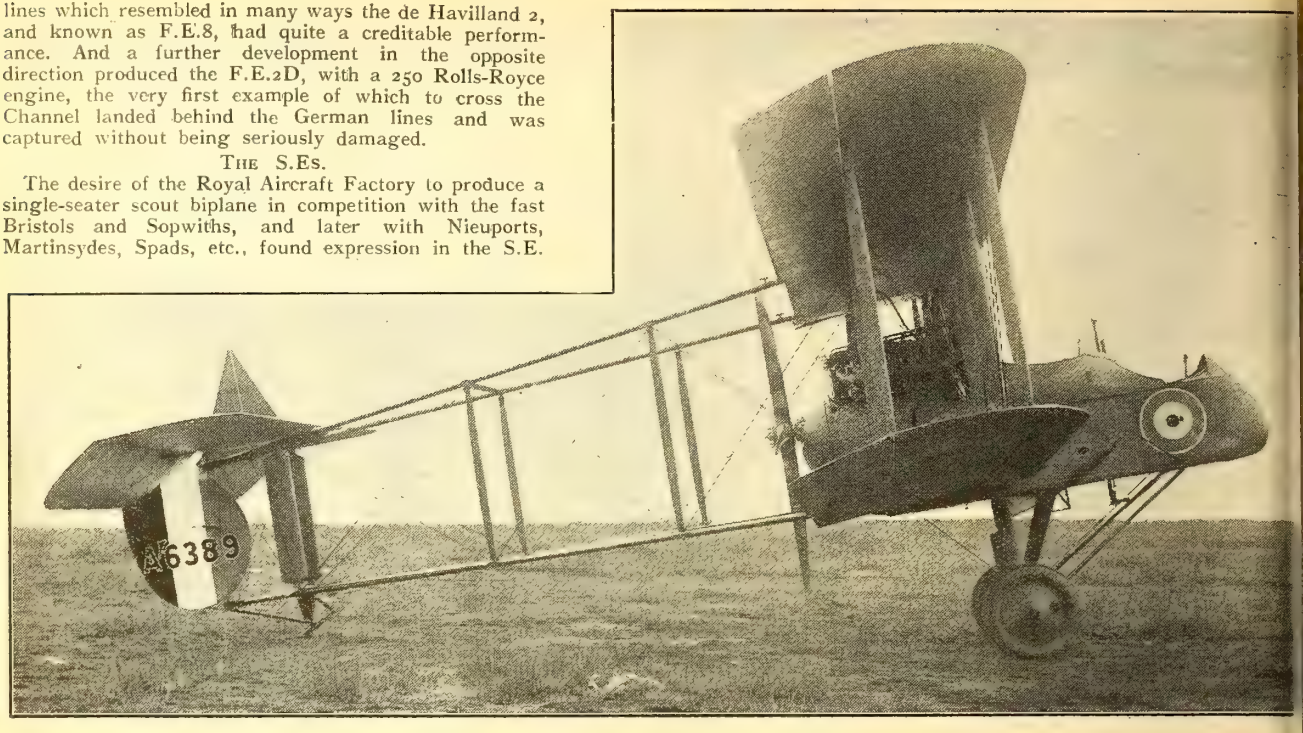
Representatives in Birmingham, Manchester, Leeds, Glasgow, Newcastle-on-Tyne, Edinburgh, Southampton, Belfast, Cardiff, and the London districts.

Telegrams: "Upcast, Rand, London." *Managing Director:* G. H. MANSFIELD. *Telephone: Gerrard 276.*

lines which resembled in many ways the de Havilland 2, and known as F.E.8, had quite a creditable performance. And a further development in the opposite direction produced the F.E.2D, with a 250 Rolls-Royce engine, the very first example of which to cross the Channel landed behind the German lines and was captured without being seriously damaged.

The S.Es.

The desire of the Royal Aircraft Factory to produce a single-seater scout biplane in competition with the fast Bristols and Sopwiths, and later with Nieuports, Martinsydes, Spads, etc., found expression in the S.E.



Side View of the F.E.2D. Biplane, with 250-h.p. Rolls-Royce engine. The small triangular fin above the tail plane is characteristi of the bigger F.E. two-seaters. The supplementary fins, created by putting specially deep streamlining on the rear-most tail struts, are worthy of note.

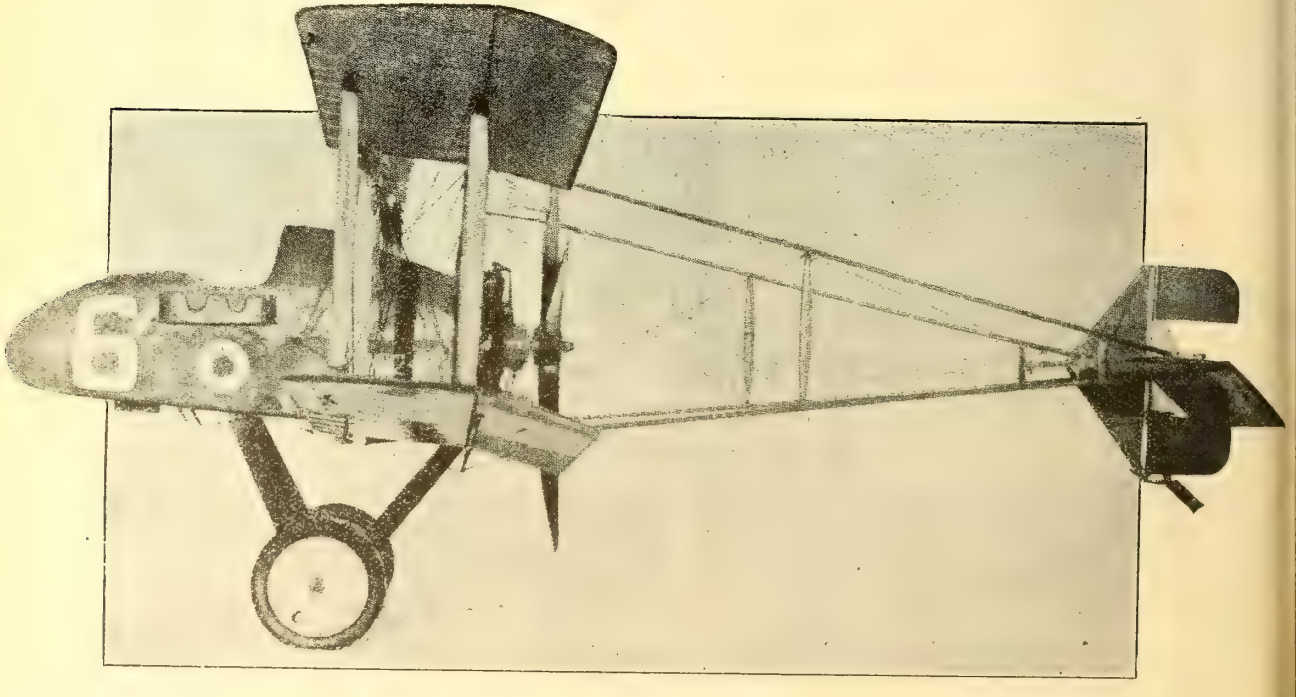
(Scouting Experimental) type. S.E.2, which flew in peace time, was an elaborate attempt at reducing head-resistance, there being only one row of struts between the wings and a round tapering fuselage. Driven by a 160-h.p. Gnome, with 14 cylinders, this small machine exhibited great speed, but otherwise her performance was poor and she was almost impossible to control. Also the type of engine was very unreliable.

The S.E. 5 type, an improved version with Hispano-Suiza engine, show a better all-round performance. The chief criticism is that they are too stable, and that it is therefore difficult to manœuvre them rapidly in air-fighting, for which reason slower enemy aeroplanes which are specially controllable can hold their own by keeping on turning inside the S.E. wh the pilot tries to bring his gun to bear.

The Raison d'Etre.

It would be difficult to demonstrate that the Royal Aircra Factory has ever produced an aeroplane (except the origin B.E.) which was superior to its contemporaries, but if only t existence of the B.Es., R.Es., F.Es. and S.Es. has resulted spurring the Aircraft Industry to further efforts, they have n been useless.

At the same time one is entitled to register the person opinion that internal competition between "Trade" firms wou have produced equally good results, especially if the money whi



Side View of an F.E.8, captured by the Germans.

Firth's "Speedicut" High-Speed Steel

For turning Tools.

"Speedicut" Milling Cutters
and Drills
For all workshop purposes.

Thos. Firth & Sons Ld.,
Sheffield.

VICKERS LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Aviation Department, Imperial Court,
Basil Street, Knightsbridge, S.W.3.

Telephone No.—
KENSINGTON 6520 (4 lines).

Telegraphic Address—
VICKERFYTA, KNIGHTS, LONDON.



ARMSTRONG, WHITWORTH

NEWCASTLE-UPON-TYNE.

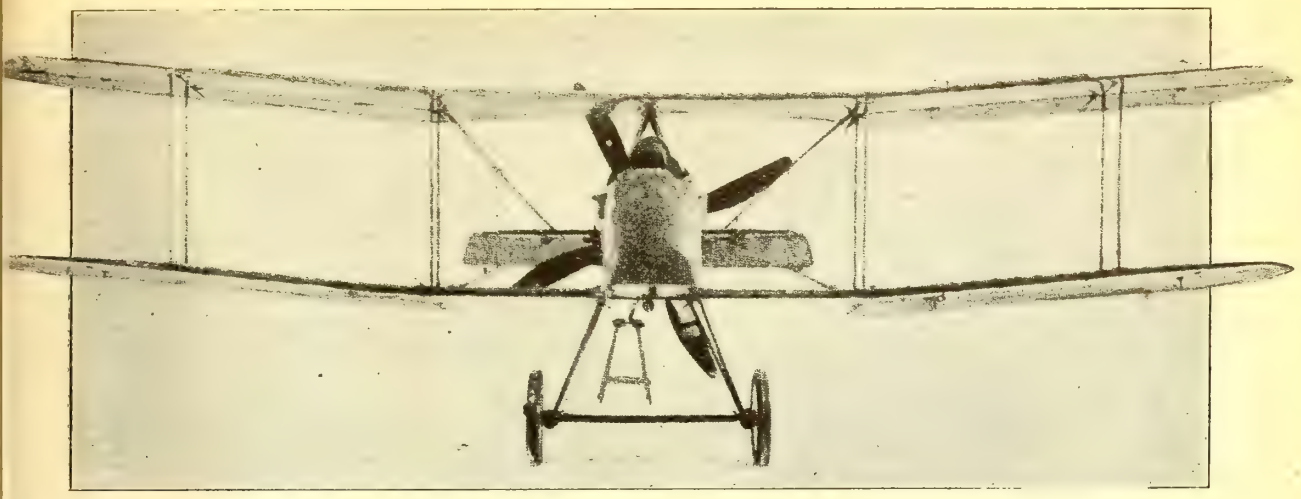
TELEPHONE:- 500 GOSFORTH.
TELEGRAMS:- ARMSTRONG AVIATION,
NEWCASTLE-ON-TYNE.

BEARDMORE AERO ENGINES

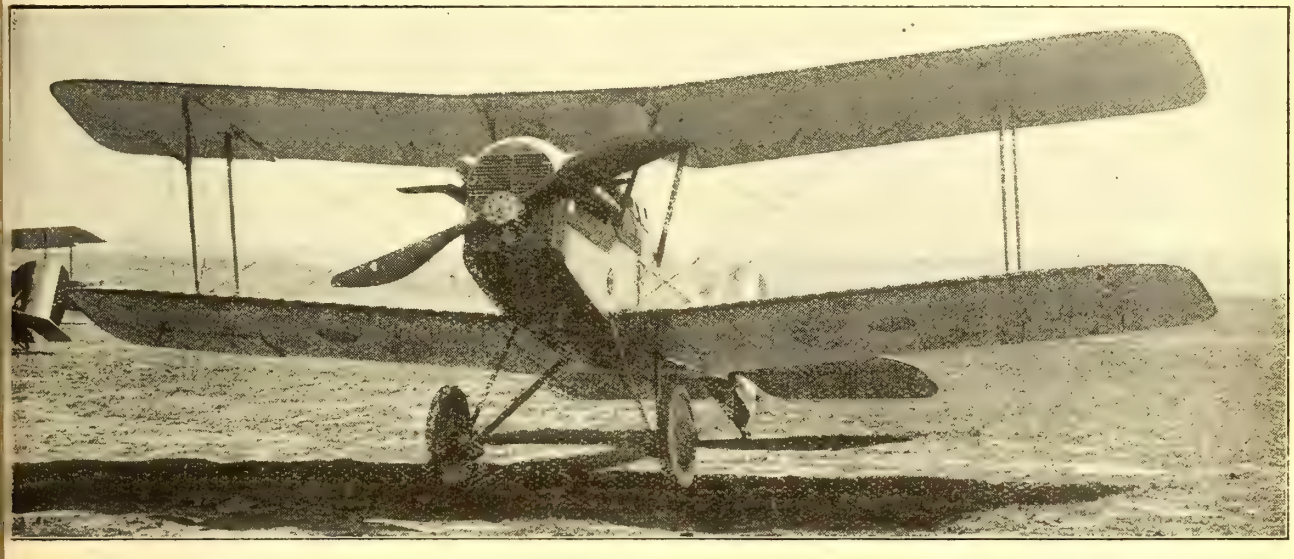
"A Sound Engineering Job."

THE BEARDMORE
AERO ENGINE Ltd.,
London Showrooms and Depot:
112, Great Portland Street,
LONDON, W.1.
Telephone: Gerrard 238.

C.D.G.



Front View of an F.E.8, captured by the Germans.



Three-quarter Front View of an S.E. single seater with 150-h.p. Hispano-Suiza engine. The grille in the nose is the adjustable blind, which regulates the supply of air to the radiator. The pronounced dihedral angle of the wings is unusual in a single-seater, and the resulting stability is an advantage which is still debated.



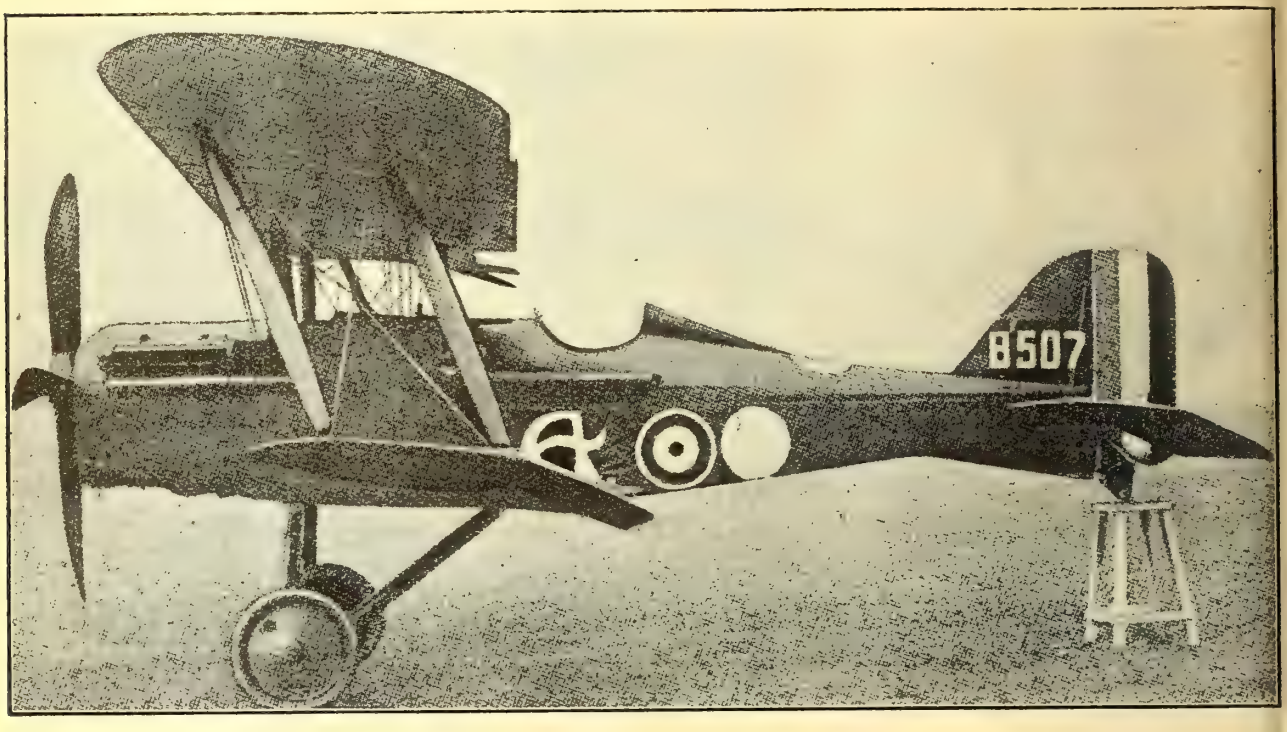
Three-quarter Rear View of an S.E. The arrangement of the Lewis gun on the top plane is clearly indicated. It will be seen that ailerons are fitted to the top and bottom planes. The "conservatory" wind-shield is not commonly found in these days.

was spent between 1911 and 1916 in developing the R.A.F. types, and in buying "Chinese copies" built under contract, had been expended freely in buying "Trade"-designed machines produced under the spur of competition increased by prospects of handsome rewards in the form of large orders.

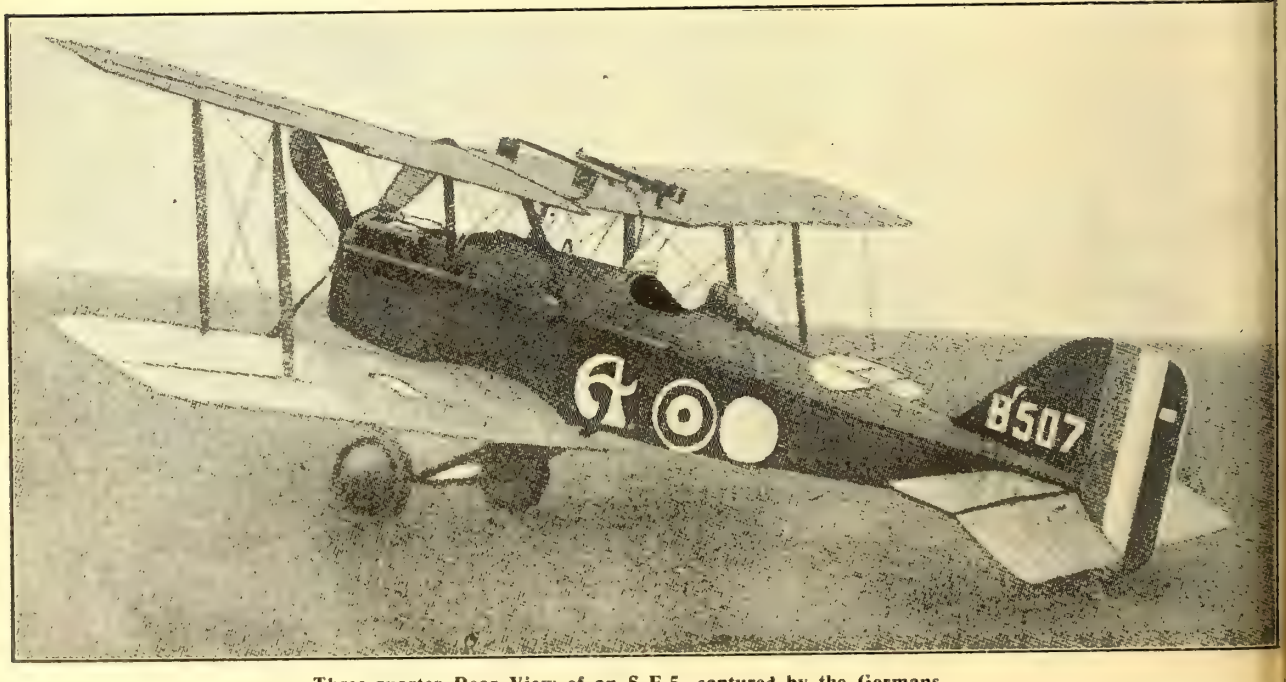
This argument is borne out by the fact that the best machines of to-day are all "Trade" products designed by people who have never been connected with the R.A.F., with the sole exception of the designer of the original B.E. A comparison between the performances of the D.H. types produced by him since he left the R.A.F., and those of the types produced by the R.A.F. since he left rather emphasise the benefits of free competition unhampered by "State Aid."

To-day the policy of the Air Minister, himself a business man and engineer of wide experience, is to encourage to the fullest degree the production of new and improved "Trade" designs, and the position of the R.A.F. at the Front is the fullest justification of this policy, which he has pursued during the 18 months which he has spent in various responsible positions at the Air Board and Air Ministry.

Nevertheless, for purely historical reasons, it seems well to place clearly on record the developments of the R.A.F. aeroplanes so far as it is possible to do so, which means up to the types which are known to have fallen into enemy hands. One hopes that the collection of photographs will be found of interest.



Side View of an S.E.5, captured by the Germans. The stream lining behind the pilot's head is noteworthy.



Three-quarter Rear View of an S.E.5, captured by the Germans

Allen's Steels

For Motor Cars - -
For Aeroplanes - -

Aeroplane Steels.

Allen's Catalogue D. (Aeroplane and Motor Steels) contains particulars of the following steels :—

Allen's Nickel Chrome Steel.
Allen's Chrome Vanadium Steel.
Allen's Shrapnel-Proof Steel.
Allen's Special Valve Steel.
Allen's H. T. Alloy Steel.
Allen's £ s. d. Case-hardening Steel

Write for Catalogue D.
(Post Free).

Edgar Allen & Co. Ltd
Sheffield.

GWYNNES
LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE

"CLERGET" PATENT AERO ENGINES.

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

ENGINEERS, LONDON.

"GWYNNE, LONDON."

THE PATENTS INDEX.

The subjoined list of recent inventions has been specially compiled by THE AEROPLANE from the current Official Patents Records.

PATENT APPLICATIONS.

Adams, R. C. Ground-speed and track angle indicator. No. 9533. June 10th.
Allen, R. G. Clinometers for use on aircraft. No. 9713. June 13th.
Aron, C. Inclination or position meter for aircraft. No. 9518. June 10th.
Asperen, C. H. van. Aerial lifting devices. No. 9519. June 10th.
Athimon, F. Pliers for forming loops and eyes in aeroplane stay wires. No. 9660. June 12th.
Beaver, W. J. Bombs for use on aircraft, etc. No. 9786. June 14th.
Bleasby, D. P. Device for indicating lateral inclination of aeroplanes, etc. No. 9875. June 15th.
Boulton and Paul. Loading and discharging devices for aircraft. No. 9576. June 11th.
British Cellulose and Chemical Manufacturing Co. Covering and producing tautness of aeroplane wings, etc. No. 9488. June 10th.
Brunton, J. D. Fastenings for wires, stays, rods, etc. No. 9478. June 10th.
Crowther, N. Aeroplanes. No. 9483. June 10th.
Diederichs, H. F. L. Aeroplanes. No. 9528. June 10th.
Dunlop Rubber Co. Treatment of aluminium-coated fabrics for air and gas containers. No. 9617. June 12th.
Embiricos, A. A. Aeroplanes. No. 9561. June 11th.
Greenhill, M. Doping aeroplane canvas, etc. No. 9818. June 14th.
Hammond, A. B. Reinforcement of air screws or propellers. No. 9564. June 11th.
Hamnett, H. Signalling apparatus for motor-cars, ships, submarines, aircraft, etc. No. 9904. June 15th.
Hartley, C. Tubes for bombs, etc., and method of releasing same from aircraft. No. 9699. June 13th.
Hunt, N. H. Sights for use on aircraft. No. 9665. June 12th.
Hutchinson, H. Aircraft net. No. 9808. June 14th
Jenkins, F. C. Aircraft. No. 9853. June 14th.
Kahl, J. F. Flying machines. No. 9590. June 11th.
Kitchen, E. Stabilising and speed-increasing devices for aircraft. No. 9858. June 15th.
Livens, F. H. Bombs, shells, etc., for emitting lethal vapours. No. 9749. June 13th.
Manzoni, A. Aerial torpedoes. No. 9850. June 14th.
Nieuport and General Aircraft Co. Bodies for aeroplanes, etc. No. 9814. June 14th.
Nieuport and General Aircraft Co. Joint for parts of aeroplanes, etc. No. 9815. June 14th.
Nieuport and General Aircraft Co. Attachment of aerofoils of aeroplanes. No. 9861. June 14th.
Ransome, A. L. M. Clips for aeroplanes, etc. No. 9780 June 14th.
Schurr, A. E. Aeroplanes. No. 9796. June 14th.
Smith, W. Aircraft. No. 9769. June 13th.
Tarrant, W. G. Attaching and securing coverings to framing, etc., of aircraft. No. 9612. June 11th.
Thornber, J. Self-inflating coat, etc., for aeronauts. No. 9546. June 11th.
Yost, R. W. Fuselage strut socket for aircraft. No. 9653. June 12th.

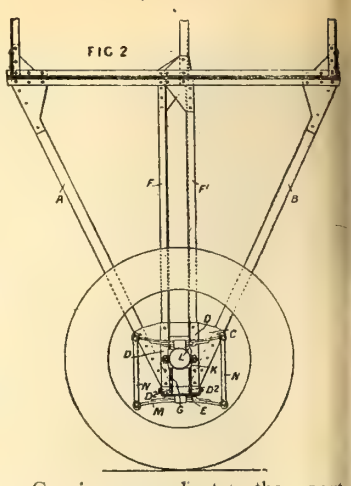
COMPLETE SPECIFICATIONS ACCEPTED, PRINTS OF WHICH CAN BE OBTAINED ON AND AFTER JULY 4TH, 1918.

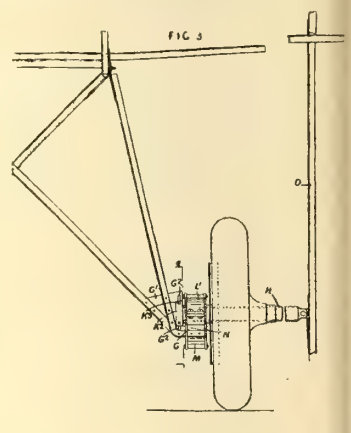
989/15. Feb. 27th, 1914. Soc. Clerget, Blin et Cie. Carburetters for internal combustion motors.
116,301. Dec. 11th, 1916. Perry, T. O. Aircraft for mechanical flight and automatic soaring.
116,338. June 5th, 1917. Williams, W. F. Aeroplanes.
116,363. June 12th, 1917. Pashley, C. L., and Pashley, A. H. D. Landing indicating devices for aeroplanes, flying machines, and other aircraft.
116,364. June 12th, 1917. Ritchie, H. R. Balancing arrangements for aircraft.
116,460. Nov. 28th, 1917. O'Rourke, C. H. Aeroplanes.

ABRIDGMENTS OF RECENTLY PUBLISHED SPECIFICATIONS.

114,891. Aeronautics. MOORE, E. H., 20, Baskerville Road, Wandsworth Common, London.

SHOCK OF LANDING, DEADENING; LAND WHEELS.—A landing chassis comprises a frame having means for guiding the end of a wheel axle against the resistance of a pair of opposed semi-elliptic springs connected together by links and secured respectively to the axle and frame. A single axle carrying two wheels may be used, or separate axles, each having a wheel at one end and pivoted at its other end to a member depending from the machine, may be employed. Fig. 2 shows a side view of a chassis having a single axle. Two side frames each comprise two convergent members A, B, connected at their lower ends by a plate C, on the outside of which two angle members D are secured. The lower ends of the members D are bent outwardly at D^2 to form a bracket, to which is secured a gusset plate G for connecting the side frame to one of two inclined members F, F^1 extending to the machine frame. A plate E, which may be part of the plate C, is secured to the parts D^2, and carries a spring M. The ends of the spring M are connected by links N to a spring L, secured to a member K on the axle guided between the members D. Fig. 3 shows a front view of a modification in which two axles H are used pivoted at their outer ends to members O depending from the planes. In this form, a central frame similar to that shown in Fig. 2 is used, but the side members are brought close together at their lower ends, and the gusset plate G secured between them. The gusset plate has an extension G^1, slotted at G^2, to take pins or rollers K^3 carried by cheeks K^2 on the inner ends of the axle, and embracing the plate extensions G^1. A spring suspension similar to that shown in Fig. 2 is used, but the links N are joined at their centres to compensate for the curvilinear movement of the axle ends.





THE HUMBER COMPANY'S SPORTS MEETING.

As the result of the recent sports meeting held by the firm of Humber, Ltd., Coventry, the very substantial donation of £520 has been handed to the Coventry and North Warwick hospital.

THE BRITISH MAGNETO INDUSTRY.

The first member of the newly instituted British Magneto industry on whom public honours have been bestowed is Mr. Charles Ashton Lister, J.P., the chairman of the M-L Magneto Syndicate, Ltd., of Coventry, who has been gazetted a Commander of the Order of the British Empire. Mr. Lister, who is a director of the famous agricultural engineering firm of R. A. Lister & Co., Ltd., of Dursley, Glos., has devoted much of his time recently to public work.

A WORTHY TRIBUTE.

On June 23rd a memorial to Douglass Morris Harris, A.B., R.N.V.R., the heroic wireless operator of his Majesty's drifter "Floandi," was unveiled by Major-General Mark Kerr, who was Rear-Admiral in command of the British Adriatic Squadron at the time Mr. Harris was killed when making entries in the log of the vessel. The memorial has been subscribed for by readers of the Wolverhampton "Express and Star," and the form was thrown open to competition by past and present pupils and teachers of the Wolverhampton Art School.

Douglass Harris was the son of Mr. Leo Harris, well known to the Aircraft Industry as being a moving spirit in the Imperial Light Co., Ltd., and in the firm of Hays, Hunter & Standen Major-General Mark Kerr, R.A.F., was one of the earliest of Naval officers to appreciate the importance of aviation, and now commands an area of the Royal Air Force.

A WORKS ENTERTAINMENT.

On June 15th the employees of the Pulvo Engineering Co., Ltd., held a concert at the Holborn Hall in aid of the British Red Cross Society. A very successful programme was presented and a satisfactory amount was realised for the Red Cross.

THE AIRCRAFT TRADER

MARKET TOPICS.

Prices are for quantities on usual terms.

COPPER.—Business is proceeding favourably, now that the American authorities have fixed the price, and although there are rumours of a shortage of Copper, the output continues to give satisfaction and would rather indicate that there is a likelihood of a small surplus being available for general commercial purposes, although, in view of the critical position during the second year of the war, one would expect the authorities to exercise a little foresight and build up stocks as a safeguard against unforeseen difficulties.

The U.S.A. official price is still being discussed in certain quarters, and there will undoubtedly be strong representations made in August for an increase. Furthermore there are certain indications that they may meet with success.

Official prices here remain unaltered, and the position continues favourable.

TIN.—The position here is more comfortable, and prices are declining to a more reasonable level. Stocks have, apparently, increased recently. Eastern prices have had a collapse, having declined to as low as £337, which is about £8 higher than the market here. It is certainly time there was a drop.

It was indicated in these columns about five weeks ago that the Allies should co-operate with the object of eliminating speculation from the Eastern market, and it is stated that this is now being done.

The position in U.S.A. is now a little steadier although there is still a feeling of nervousness, and although about ten days ago American buyers were buying everything they could lay their hands on, at any price, they are now apparently holding back in order to see what effect the recent fall in prices will have on the market there.

COMPARATIVE PRICES.

June 17th	£329	0	0	per ton.
June 4th	£345	10	0	per ton.
May 22nd	£360	0	0	per ton.
May 9th	£380	0	0	per ton.
Highest price, 1917	£309	0	0	per ton.

LEAD.—There is not much difficulty in obtaining supplies for national requirements. It is, however, impossible to obtain any Lead for domestic purposes. Prices remain unchanged.

STEEL.—Supplies of Aircraft Steels are still very satisfactory. In fact there appears to be a surplus available. It is quite probable that this state of affairs is only temporary. The output of Steel, at present, is still on the increase, and the efforts to effect still larger increases in output are unrelaxed. There are ample supplies of Cast Steel available, due, as pointed out in these columns before, to the large quantity which was ready for Russia when deliveries were stopped. High Speed Steel is fairly easy to obtain at present.

Steel Sheet to A.M. specification is becoming extremely difficult to obtain, and the situation does not, at present, show any signs of improving.

Prices are unchanged.

TIMBER.—There is hardly any Silver Spruce whatever coming into the country, and although, as stated previously, a substitute has been issued to contractors, very few have as yet had any practical experience of its use and the position cannot be considered satisfactory.

A little more Walnut has been received recently. There does not, however, appear to be much available. The same remark applies to Mahogany.

The question of Plywood control appears to be "hanging fire."

Prices remain unchanged.

FABRIC.—Supplies are still satisfactory, and prices remain unchanged.

A CHANGE OF NAME.

To avoid confusion with a firm of similar name, the title of the Super Aviation Co., Ltd., has been changed to the Sceptre Aviation Co., Ltd. No change has been made in the management or in the organisation of the firm.

A GREAT LOSS TO ITALY.

As if to disprove those futile statements as to "soft, safe jobs at home aerodromes" one regrets having heard that Italian firms have had to bear two more losses since my last notes.

It has fallen to the lot of the Macchi firm to lose that great pilot Clement Maggiora, who has been associated with them since the beginnng of the war and was a well-known pilot outside Italy for several years before it. He was understood to have been the first man to land on a frozen lake, which he found different to his expectations. Since when he has been trying new things almost continuously. His death occurred through an accident at Varese.

ANOTHER CAPRONI LOSS.

The Caproni Brothers had their second loss by the death of Capt. Silvio Resnati, in America, through the disintegration in the air of a C.A. biplane built in that country. He was the son of an esteemed Milan professional family; the other son, also a pilot, is a prisoner of war.

Capt. Resnati had done a big "bit" at the front before he joined the Aero Corps, and was immensely valuable as a C.A. propaganda pilot. The accident, coming only a few days after the officially announced decision of our North American Allies to produce Caproni bombing machines, is doubly unfortunate to all concerned.

POSTAL AFFAIRS IN ITALY.

In a projected Bill being drawn up for presentation to the Cabinet, the monopoly of the aerial transport of correspondence is to be conceded to the Ministry of Posts and Telegraphs.

T. S. HARVEY.

THE CONSERVATION OF IRISH FLAX SEED.

The Minister of Munitions has issued an Order directing every grower of flax in Ireland during the season of 1918 to save the seed from one-eighth of his crop, and to comply with any regulations that may be prescribed in this behalf by the Department of Agriculture and Technical Instruction for Ireland. The Order does not apply to any grower having under flax in the year 1918 a total area not exceeding two statute roods, nor to flax of any variety other than a fibre variety.

No person shall, without a permit issued by the Department of Agriculture and Technical Instruction for Ireland, purchase, sell, or offer for sale from or on behalf of any grower of flax or any other person, any flax on foot, or undeseeded flax straw saved for seed in compliance with the provisions of the Order

THOSE AWFUL ORDERS.

From the "Times" of June 13th:—

Sir,—I am glad to see four civilian friends have been made Knights of the British Empire. One of them, under 50, has been working for the Government for nearly one year—the others less. I am glad, too, to see other friends get the C.B.E., including one under 40 who has not had the satisfaction of crossing the Channel since war broke out, though he wears uniform. But I am thinking more of another friend, who, at the commencement of the war, although he was over 50, volunteered, went out with his battalion, fought in the trenches, was knocked out but went out again, has been twice recommended for an award, and is still serving. He wears on his breast just the ribbons for a previous war—no more. I know, too, that his is no exceptional case; and I just wonder how these things are arranged.

Your obedient servant, X.

A COLE FESTIVITY.

On Saturday, June 1st, the employees and various friends of the directors of William Cole & Son, Ltd., of Hammersmith, spent an evening at the Café Monico, as proof of the goodwill which exists amongst the personnel of the firm.

Mr. Albert Cole was responsible for the function and presented a watch to each of five or six of the oldest employees of the firm, a knife to each of the charge-hands, and a cheque to the Secretary and Assistant. The proceedings terminated with a musical entertainment which was well received by those present.

ANOTHER BONUS.

Semi-skilled and unskilled men aircraft workers are awarded 12½ per cent. bonus to time-workers and 7½ per cent. to piece-workers, as from January 1st, 1918.



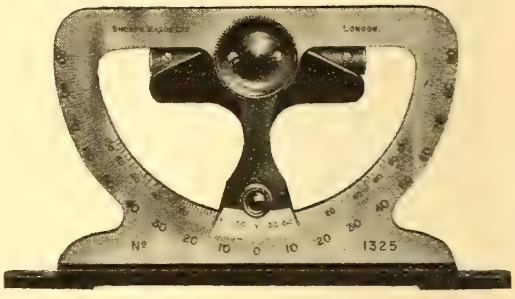
HEIGHT MEASURING

ANEROID ALTIMETERS

(Illustration is Half Actual Size.)

:: FOR EVERY TYPE OF ::

AIRCRAFT



"S. & M." INCIDENCE GAUGE

FOR MEASURING ANGLES,
— TO CLOSE LIMITS. —

(Illustration is Half Actual Size.)

Manufactured by

SHORT & MASON, Ltd.,

WALTHAMSTOW, LONDON, E.17.

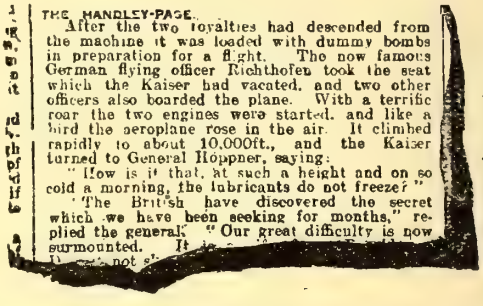
Telegrams: "ANEROID, PHONE, LONDON." Telephone: WALTHAMSTOW 180.



Kaiser (*loq.*): "How is it at such a height on so cold a morning the lubricants do not freeze?"
Gen. Hoppner: "The British have discovered the secret which we have been seeking for months."
Vide "Daily Mail," see above.

A BRITISH FIRM BEATS THE GERMANS

THE SECRET



THE HANDLEY-PAGE.

After the two royalties had descended from the machine it was loaded with dummy bombs in preparation for a flight. The now famous German flying officer Richthofen took the seat which the Kaiser had vacated, and two other officers also boarded the plane. With a terrific roar the two engines were started, and like a bird the aeroplane rose in the air. It climbed rapidly to about 10,000ft., and the Kaiser turned to General Hoppner, saying:

"How is it that, at such a height and on so cold a morning, the lubricants do not freeze?"

"The British have discovered the secret which we have been seeking for months," replied the general. "Our great difficulty is now surmounted. It is

Extract from "Life in Essen." Eye-witness's Account. —"Daily Mail," April 8, 1918.

WAKEFIELD Castrol 'R' MOTOR OIL (Racing)

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

was the lubricant used

Castrol "R" possesses the lowest cold test of any known Aero Engine Oil.

C. C. WAKEFIELD & CO., LTD.

WAKEFIELD HOUSE, CHEAPSIDE, LONDON, E.C.2

C.D.C.

AIRCRAFT FINANCE

CURRENT TOPICS.

BUOYANT CONFIDENCE.

One might reasonably pardon an unsophisticated stranger, who, after a casual view of present Stock Exchange conditions, jumped to the conclusion that either a very successful Peace was imminent or else that the financial strain of the war is absurdly light. Markets are so deceptively buoyant; the price of most securities is rising and it would seem easier to sell things than buy them.

The Real Position.

But the buoyancy is not quite so genuine as it seems. Unquestionably the war news is considered encouraging, but present conditions are primarily due to the recent action of the Treasury in artificially lowering the value of money. The object was to force money lying fallow on deposit with the banks into War Bonds, Treasury Bills, and essentially national financing, and it happens that a lot of this money is finding its way into a multitude of other investment securities for remunerative employment.

Activity of Vickers Shares.

It will be noted with considerable interest that aircraft and associated securities have claimed more than an ordinary degree of attention in this scramble for investments. Noteworthy prominence, for example, has been attained by Vickers shares, which have risen substantially. Not only is it now being rumoured that the company will soon disgorge some of the accumulated war profits in the shape of a bonus among shareholders, but also that a big amalgamation scheme is in progress of evolution. Every little helps the speculator, no matter how unconvincing it may be.

Most Others Conspicuous.

Rolls-Royce shares also have developed conspicuous strength, being steadily absorbed on prospects, and Armstrong Whitworths have claimed a big following. Humbers and a host of others have each got their own followers who claim to know that profits are expanding rapidly, and who claim to see correspondingly bigger dividends, and in some cases substantial bonus in the form of new shares. Without a doubt, the existing high level of prices discounts a lot of prosperity; but, as some of the optimists put it, is there any other industry making such a pile of money as many of these undertakings?

Why Darracq Shares Fell.

The recent weakness in the shares of A. Darracq & Co. would seem to have disturbed some holders. Only a few weeks ago they were selling as high as 38s. each, since when they have been well under 30s. and have rallied a little. The set back is to be ascribed to the German bombardment of Paris, where the company's factories are situated. It does not transpire that these have been damaged or even that they are really in the danger zone, so shareholders ought to sit tight.

Dividends and Present Price.

The Darracq is really a holding company which owns practically the whole of a French concern similarly named. At the present price of 32s. the shares represent a yield of well over 12 per cent. to the purchaser on the basis of last year's dividend. This was 20 per cent., including a bonus of 5 per cent., and compared with 9½ per cent. for each of the two preceding years. The financial year ends in about three months, and as the company is loaded up with business, chiefly war work, satisfactory results are expected again. Of course, one does not know how much of the extra profit, if any, will be swallowed up by war taxes.

The Latest Amalgamation

Ruston Proctor & Co., who are actively engaged in the aeroplane industry, and Richard Hornsby & Sons, another Lincolnshire engineering concern, have agreed to amalgamate. This will be consummated by the former acquiring the assets of the latter and issuing securities like for like to the debenture and preference shareholders and to the ordinary shareholders £17 of shares in exchange for every £20 held.

Two Prosperous Concerns.

With an issued share capital of £1,352,300 and £500,000 debentures the amalgamated business will be known as Ruston and Hornsby. Both have a fine record for earnings and have paid regular dividends, and since the war both have made record distributions of 10 per cent. From the preliminary dividend statement of Ruston Proctor, it is clear that substantially bigger profits were made during the past financial year. The dividend is merely maintained, but £55,000 instead of £45,000 is added to the reserve, and £24,200 against £19,600 goes forward.

The Blériot Contract Case.

In the Chancery Division, last Wednesday, before Mr. Justice Younger, the hearing was fixed of the action brought by the Army and Navy Contract Corporation (in liquidation), of Moorgate Street Chambers, E.C., against M. Louis Blériot.

The company claimed specific performance of three contracts dated March 9th and 17th and May 17th respectively for the sale by the defendant to the company of the business carried on by defendant in the United Kingdom under the style of L. Blériot-Aeronautics. The case has many times been before the Court, his Lordship saying on the last occasion that if M. Blériot could not produce a satisfactory affidavit as to his inability to leave France at the present time, the case would proceed on Wednesday in his absence.

When the case was called on Wednesday Mr. Gore-Browne, K.C., who appeared for the Official Receiver as liquidator of the plaintiff company, said the matter had been settled, and on a certain sum being paid by defendant the action would be stayed. Mr. Hansell (who was, with Mr. Upjohn, K.C., for the defendant) had a summons for hearing on Friday, the effect of which was simply and solely that all proceedings should be stayed, and he suggested that this should be disposed of now. Counsel said he had got the sanction of the Registrar.

Mr. Hansell agreed, and his Lordship made the order.

Excellent Rolls-Royce Profits.

Excellent results are disclosed by the profit statement of Rolls-Royce covering the year to October 31st last. At £142,056 the net profits compare with £82,640 for the preceding period, which in their turn compare with a modest £44,200 for 1914-5. The dividend of 10 per cent. was declared some time ago along with the bonus of one new share "free, gratis, and for nothing" in respect of each share held.

Consolidating Their Position.

In themselves the figures are unquestionably good, but in reality they may be infinitely better than they look. And for this reason the profit is struck "after paying for all trading expenses and liberal depreciation of buildings, machinery and plant, making due provision towards writing-down to estimated post war value, and depreciation of new buildings, machinery and plant erected, making provision for estimated amount payable under the Finance Acts and charging repairs and replacements to revenue."

Generous Reserve Allocations.

These allowances are an unknown quantity to the outsider; but it is different with the allocation to the various reserves. Thus it is specified that £45,000 to be ear-marked for Income-Tax Account in comparison is £30,000 twelve months previously. Moreover, £50,000 is added to the reserve, and £30,000 is provided for the War Contingency Account, whereas in the previous year the only corresponding allocation was £20,000 to the Debt Guarantee Fund. There remains a balance of £40,200 to be carried forward, against £44,100 brought into the accounts.

COMPANIES ANNOUNCEMENTS.

NEW COMPANIES REGISTERED.

T. H. M. Manufacturing Co., Ltd.—Private company. Registered June 18th. Capital £2,000 in £1 shares. Manufacturers of and dealers in aerial conveyances, and component parts thereof, motor cars, lorries and cycles, mechanical, electrical and marine engineers, etc. The subscribers are:—

B. N. Taylor, Glenside, Edgwarebury Lane, Edgware, Middlesex, motor engineer (80 shares); F. C. Hayter, Aspendin, Manor Park Crescent, Edgware, Middlesex, aeronautical engineer (5 shares); H. S. Mallett, 172, Finchley Road, Hampstead, window blind maker (5 shares).

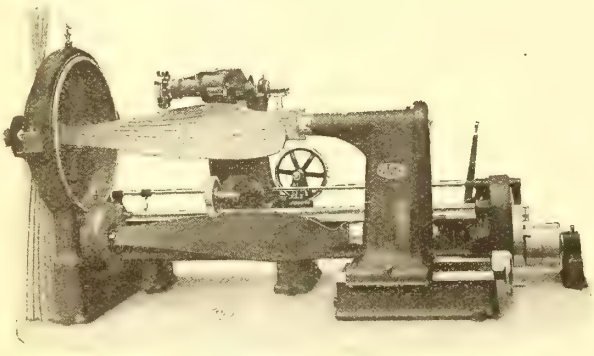
The first directors are:—B. N. Taylor, F. C. Hayter and H. S. Mallett. Registered office: 11, Rosmont Road, Hampstead, N.W.3.

Aero Engine Reconstruction Co., Ltd.—Private company. Registered June 19th. Capital, £3,000, in £1 shares. To manufacture, reconstruct, repair, purchase, sell, or deal in all electric, steam, gas, and oil, or other engines for motor cars, omnibuses, lorries, aeroplanes, ships, etc.

The subscribers (each with one share) are:—W. W. Clois, Torquay, marble merchant; C. Wright, The Hollies, Mill Hill, N.W., engineer. The first directors are not named.

SAGAR

AUTOMATIC PROPELLER SHAPING MACHINE



The Machine illustrated has been specially designed for shaping Airscrews and Aeroplane Propellers with two or four blades from 7 feet to 11 feet 6 ins. diam., with blades up to 13 ins. wide.

Fuller particulars of the above or any other kind of Wood-Working Machinery suitable for Aircraft Factories will be gladly sent on request.

J. Sagar & Co., Ltd., Saw Mill Engineers,

LONDON OFFICE: 60, WATLING STREET, E.C.

W. G. TARRANT.

CONTRACTOR TO THE AIR MINISTRY.

AIRCRAFT HEAD OFFICES:
BYFLEET, SURREY.
Telephones :: Byfleet 1, 2, and 3.

LONDON OFFICES:
CLOCK HOUSE,
ARUNDEL ST., W.C. 2.
Telephone :: :: Gerrard 8362.

THE CAMDEN CONSTRUCTION CO., LTD.

289, HIGH STREET, CAMDEN TOWN, N.W.1.

CONTRACTORS FOR THE ERECTION OF BUILDINGS

FOR THE AIRCRAFT AND ALLIED TRADES

IN

THE MATERIALS AT PRESENT AVAILABLE WHICH CONDUCE TO SPEED

DESIGNS AND ESTIMATES SUBMITTED PROMPTLY.

(*Continued from page* 2334B.)

E. M. Bates (Lt., A.S.C.), and to be Hon. Lt., S. L. Cannon (temp. Sec. Lt., Shrops. L.I.), A. W. Parr (temp. Sec. Lt., attd. Middx. R.), May 16th; F. C. D. Scott (Lt., Durh. L.I., T.F.), and to be Hon. Lt., C. J. Paterson (Lt., Inns of Court O.T.C., T.F.), and to be Hon. Lt., C. G. Pegg (Sec. Lt., Middx. R., T.F.), F. W. Crawford, M.M. (Lt., E. Ont. R., C.E.F.), and to be Hon. Lt, May 17th; F. S. Fisher (Sec. Lt., R.G.A., Spec. Res.), R. L. Bateman (Lt., R. Fus., Spec. Res.), and to be Hon. Lt., A. W. Sharp (Sec. Lt., Bedf. R., T.F.), F. S. Williams (Lt., Mon. R., T.F.), and to be Hon. Lt., E. R. Zealley (temp. Lt., R. Lanc. R.), and to be Hon. Lt., May 18th; M. H. Bird (Lt., Cent. Ont. R., C.E.F.), and to be Hon. Lt., K. F. Caird (temp. Lt., Trg. Res. Bn.), and to be Hon. Lt., J. Jones (Lt., Northn. R., T.F.), and to be Hon. Lt., May 19th; D. F. Brooks (temp. Sec. Lt., attd Middx. R.), H. L. Arnott (Lt., W. Rid. R., T.F.), and to be Hon. Lt., A. E. Haynes, M.C. (Lt., R.H.A.), and to be Hon. Lt., May 20th; F. S. E. May (Sec. Lt., R.W. Surr. R., T.F.), May 21st; J. T. I. Brownlee (late Lt., S.A. Inf.), and to be Hon. Lt., June 13th.

The follg. are granted temp. commns. as Sec. Lts., Obsr. Officers:—D. R. MacDonald (temp. Capt., A.S.C.), and to be Hon. Capt., June 1st; J. E. Saunders (Lt. Lanc. Fus., T.F.), and to be Hon. Lt., F. M. Loly (Lt., E. Surr. R., Spec. Res.), and to be Hon. Lt., R. McK. Jamison (temp. Sec. Lt., R. Ir. Rif.), June 7th; J. J. Fenwick (temp. Sec. Lt., attd. R. Scots), T. A. Cousins (Sec. Lt., R.F.A., Spec. Res.), C. E. Willows (Lt., Lond. R., T.F.), and to be Hon. Lt., H. Hutchinson (Sec. Lt., R.F.A., Spec. Res.), J. W. Lissett (temp. Lt., E. York. R.) and to be Hon. Lt., D. G. Porter (Sec. Lt., R.F.A., T.F.), A. P. Quaife (Lt., Dorset R., Spec. Res.) and to be Hon. Lt., M. A. Waterer (Sec. Lt., R.E., Spec. Res.), C. Wilkinson, M.C. (temp. Lt., R.F.A.), and to be Hon. Lt., June 8th; F. G. Wall (temp. Sec. Lt., Res. R. of Cav.), June 9th; E. Dumville (Sec. Lt., W. Rid. R., T.F.), June 10th; J. H. Odell (Lt., C.F.A., C.E.F.), and to be Hon. Lt., F. Butterworth (temp. Sec. Lt., W. York. R.), J. McAslan (Sec. Lt., High. L.I., T.F.), L. G. Hills (temp. Sec. Lt., R. Fus.), G. L. Pargeter (temp. Sec. Lt., R. Fus.), R. A. B. Pope, M.C. (temp. Lt., M.G.C.), and to be Hon. Lt., H. E. Chapman (Sec. Lt., R. Highrs., T.F.), C. A. Stubings (temp. Sec. Lt., Norf. R.), G. I. Carr (Lt., Alberta R., C.E.F.), and to be Hon. Lt., K. McDonald (Lt., Northd. Fus., T.F.), and to be Hon. Lt., A. C. Pollard, M.C. (Lt., Br. Columbia R., C.E.F.), and to be Hon. Lt., A. E. Garrison, M.C. (temp. Sec. Lt., York. and Lanc. R.), R. C. Clarke (temp. Sec. Lt., R. Fus.), H. E. Falkner (temp. Lt., Suff. R.), and to be Hon. Lt., F. N. Pickford (temp. Sec. Lt., Lanc. Fus.), G. Walker (temp. Lt., Yorks. L.I.), and to be Hon. Lt., H. S. Smith (Sec. Lt., Lond. R., T.F.), June 15th.

The follg. temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts., Obsr. Officers:—H. C. Charnley, A. E. Harris, H. Knowles, C. E. Gardner, June 7th; W. H. Smith, W. Brennan, A. Shrives, T. James, I. B. Hyslop, A. J. Bridge, June 8th.

The follg. Probationary Obsr. Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lts., Obsr. Officers:—W. H. L. Halford, A. G. V. Reeves, G. C. Bull, May 31st.

The follg. Cadets are granted temp. commns. as Sec. Lts., Obsr. Officers:—F. W. Dey, H. Mottershaw, May 4th; W. A. Cowie, E. V. Austin, J. Amos, G. A. Duthie, J. L. Tait, June 8th.

The follg. temp. Sec. Lts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as temp. Sec. Lts. (K.B.):—E. P. Caton, K. E. Judd, April 1st.

Temp. Lt. H. E. Freeman-Smith, from Obsr. Officer, to be temp. Lt. (K.B.), April 15th.

The follg. are granted temp. commns. as Sec. Lts. (K.B.):—H. Smart (temp. Lt., attd. Bedf. R.), and to be Hon. Lt., April 1st; P. C. Foster (Sec. Lt., R.F.A., T.F.), April 15th; V. R. W. Owens (temp. Sec. Lt., Middx. R.), June 1st; C. N. Poynton, M.C. (Sec. Lt., R.G.A.); C. J. P. Copner (Capt., S. Wales Bord.), and to be Hon. Capt.; Temp. Sec. Lt., J. E. Cave (late Gen. List, R.F.C., on prob.) is confirmed in his rank as temp. Sec. Lt., Obsr. Officer, June 10th.

Lt. L. D. Harthorn resigns his commn., and is granted the hon. rank of Lt., June 22nd.

Lt. H. D. Luxton relinquishes his commn. on account of ill-health caused by wounds, and is granted the hon. rank of Lt. June 22nd.

Lt. G. H. Stuart relinquishes his commn. on account of ill-health, and is granted the hon. rank of Lt., June 22nd.

The notification in "Gazette," May 31st, regarding Lt. (temp. Capt.) G. M. Thomas is cancelled.

The initials of Sec. Lt. (Hon. Lt.) J. H. Shaw are as now described, and not as in "Gazette," May 21st.

ADMINISTRATIVE BRANCH.—A. E. Robinson is granted a temp. commn. as Maj., April 1st. (Substituted for notification in "Gazette" May 21st.)

W. E. E. Stone (Lt., temp. Capt., Gen. List) is granted a temp. commn. as Lt., and to be temp. Capt., while specially empld., April 1st.

The follg. are granted temp. commns. as Lt.:—Serjt.-Maj. G. T. Stroud, April 1st; G. H. Lyall, April 16th.

J. R. Deronet (temp. Sec. Lt., Worc. R.) is granted a temp. commn. as Sec. Lt., and to be temp. Lt., April 2nd.

Lt. J. Duncan to be Lt. (from A. and S.), June 6th.

Temp. Sec. Lt. F. P. Miller (late Gen. List, R.F.C., on prob.) is confirmed in his rank as temp. Sec. Lt., June 7th.

G. T. Simonds (late R. Berks R.) is granted a temp. commn. as Sec. Lt., and to be Hon. Lt., June 10th.

The follg. are granted temp. commns. as Sec. Lts.:—H. J. Lee, May 20th; T. C. Balfour, S. Bingham, L. L. Bridgman, J. W. Brittain, F. Calnan, T. W. Crawford, T. R. Daisley, C. R. English, A. E. C. Halliday, J. Harding, B. M. Hickman, H. C. Hook, W. Johnstone, G. T. Kitto, H. Sidebottom, R. G. Sims, H. V. Stanier, J. A. Tindall, D. A. Willmott, G. H. Winckworth, J. Whitteridge, S. Wootton, B. W. Wright, June 5th; R. A. Ford, June 10th; R. J. Adam, J. K. Douglas, L. Evans, J. Winslow, June 15th; S. Aspinall, E. P. Beard, W. H. Henstridge, J. S. Hilton, N. D. Lees, T. Surr, June 17th.

The follg. Lts. (temp. Capt.) relinquish their commns., and are granted the hon. rank of Capt.:—C. E. Heathcote, F. H. Spragg, P. Westacott, June 22nd.

Lt. (temp. Capt.) F. A. Stacpole (Lt. E. Yorks R., S.R.) relinquishes his commn. on acct. of ill-health caused by wounds, June 22nd.

The follg. Sec. Lts. resign their commns.:—W. C. Whitthorne, K. J. Woodgate, June 22nd.

TECHNICAL BRANCH.—The follg. are granted temp. commns. as Lts.:—C. F. S. Gamble (temp. Sub-Lt., R.N.V.R.), June 11th; G. F. F. Eager, M.C. (temp. Lt., R.E.), June 22nd.

Lt. H. M. Whitehead to be Lt. (from A. and S.), May 13th.

Lt. (temp. Capt.) J. H. Gaudion relinquishes the temp. rank of Capt., May 31st.

Sec. Lt. (Hon. Lt.) S. H. Hewett to be temp. Lt., while empld. as Lt., June 14th.

Sec. Lt. F. S. Hetherington (late Gen. List, R.F.C., on prob.) is confirmed in his rank as temp. Sec. Lt., May 13th.

N. Whitley (Lt., Som. L. I., T.F.) is granted a temp. commn. as Sec. Lt., and to be Hon. Lt., June 8th.

Sec. Lt. S. G. Ball, from Admin., to be temp. Sec. Lt., June 10th.

Lt. J. W. Bradford (K.B.) to be temp. Sec. Lt., and to be Hon. Lt., June 11th.

MEDICAL BRANCH.—The follg. are granted temp. commns. as Capts.:—W. Enraght, June 11th; A. L. H. Rackham, June 18th.

The follg. are granted temp. commns. as Lts.:—C. Lambrinudi, June 14th; H. MacP. Cargin, L. Patchett, N. F. Stallard, June 15th; A. Kirkhope, G. A. S. Madgwick, N. H. Medhurst, J. Stark, June 17th; P. M. Carroll, June 18th; P. Ashton, June 19th.

MEMORANDA.—Maj. (temp. Lt.-Col.) R. H. Collier, D.S.O., to be temp. Col. while specially empld., June 3rd.

Lt. W. H. Holroyd to be temp. Capt. while specially empld., April 1st.

The follg. relinquish their commns. on ceasing to be empld:—Lt. P. B. Whillier, April 2nd; Sec. Lt. J. R. McGregor, April 26th; Lt. C. E. Lugard (Lt., E. Surr. R.), May 27th; Lt. E. V. Maclean (Lt., R.F.A., T.F.), May 30th; Lt. (temp. Capt.) A. M. W. Wells (Lt., R.N.V.R.), June 7th; Lt. (temp. Capt.) W. Murray (Capt., Sea. Highrs.), Lt. (Hon. Capt.) H. Gartside-Tippinge (Lt., R.N.), June 15th; Lt. M. B. Hughes (Asst. Payr., R.N.V.R.), June 17th.

WAR OFFICE, June 22nd.

REGULAR FORCES. — ESTABLISHMENTS.—R.F.C. — MIL. WING.—Flt. Comdr.—Temp. Sec. Lt. J. E. Bonniksen, Gen. List, from a Flying Officer, and to be temp. Capt. whilst so empld., Feb. 26th.

Asst. Instr. in Gunnery.—Graded as an Equipt. Officer, 2nd Cl.—Temp. Lt. J. P. Barrett, Linc. R., from an Asst. Instr. in Gunnery (graded as an Equipt. Officer, 3rd Cl.), and to be transfd. to R.F.C., Gen. List, March 31st.

Adjt.—Capt. C. V. Mercer, E. Kent R., Spec. Res., March 20th.

Equipt. Officers, 1st Cl.—Temp. Lt. A. E. Neale, Gen. List, from the 2nd Cl., and to be temp. Capt. while so empld., March 1st.

[Owing to the pressure on space a long list of awards of orders and decorations have been omitted till next week.—Ed.]

WAR OFFICE, June 24th, 1918.

REGULAR FORCES. — ESTABLISHMENTS.—R.F.C. — MIL. WING.—Balloon Officers.—Lt. W. H. Daish, Lond. R., T.F., and to be secd., temp. Lt. H. G. Yearsley, R.A., and to be transfd. to R.F.C., Gen. List, March 10th; temp. Sec. Lt. (on prob.) S. A. Odell, Gen. List, and to be confirmed in his rank, March 23rd.

Equipt. Officers, 2nd Cl.—From Flying Officers.—Temp. Lt. W. F. Fletcher, Gen. List, Lt. C. T. Wilson, R. Ir. Fus., Spec. Res., March 1st. From Equipt. Officers, 3rd Cl. and to be temp. Lts. whilst so empld.:—Temp. Sec. Lt. N. G. Arnold, Gen. List, March 1st; Sec. Lt. E. W. Brooks, Spec. Res., March 26th.

FROM THE COURT CIRCULAR.

BUCKINGHAM PALACE, June 22nd.

The following were severally introduced into the presence of The King, when His Majesty conferred decorations as follows:

The Distinguished Service Cross.—Capt. James Hart, R.A.F.; Lt. Frederick Stringer, R.A.F.

The Military Cross and Bar.—Capt. Ralph St. John Dix, R.A.F.; Lt. Arthur Hammond, R.A.F.

The Military Cross.—Capt. Basil Clark, Black Watch, attd. R.A.F.; Lt. Ross Cuthbert, R.A.F.; Lt. Harry Ford, R. Welsh Fus., attd. R.A.F.

The Albert Medal.—Flt. Lt. Victor Watson, R.N.; and

The Albert Medal in Gold.—Air Mech., 1st Grade, Harold Robinson, and Boy Mech. Eric Steere. On the occasion of an accident to one of his Majesty's airships, which resulted in a fire breaking out on board her, Flt. Lt. Watson, who was the senior officer on the spot, immediately rushed up to the car of the airship under the impression that one of the crew was still in it, although he was well aware that there were heavy bombs attached to the airship which it was impossible to remove owing to the nearness of the fire, and which were almost certain to explode at any moment on account of the heat. Having satisfied himself that there was in fact no one in the car, he turned away to render assistance elsewhere, and at that moment one of the bombs exploded, a portion of it shattering Lt. Watson's right arm at the elbow. The arm had to be amputated almost immediately.

Air Mech. H. V. Robinson and Boy Mech. E. E. Steere, on the occasion of an accident to one of his Majesty's airships which caused a fire to break out on board her, approached the burning airship without hesitation, extricated the pilot and two members of the crew, all of whom were seriously injured, and then unclipped the bombs from the burning car and carried them out of reach of the fire. The bombs were surrounded by flames and were so hot when removed that the hands of the rescuers were scorched in carrying them.

The Albert Medal.—Flt. Serjt. Albert Warne and Flt. Serjt. Horace Cannon. On Jan. 26th last, while flying in England, a pilot when attempting to land lost control of his machine, which crashed to the ground from a height of about 150ft. and burst into flames. Flt. Serjts. Warne and Cannon went to the rescue of the pilot at great personal risk, as one tank of petrol blew up and another was on fire; moreover, the machine was equipped with a belt of live cartridges, which they dragged out of the flames. They managed to extricate the pilot, who was strapped to the burning 'plane, but he died shortly afterwards from his injuries and burns.

OFFICIAL COMMUNIQUES.

NAVAL.

Admiralty Communiqués.

June 18th.—During the period June 13th-16th inclusive weather conditions have somewhat hindered operations by Naval Air Force contingents.

Bombing raids were, however, carried out on the following objectives:—Zeebrugge, Ostend docks, Bruges docks, Thorout railway junction and aerodrome, Ghistelles aerodrome, Le Brugeoise works, (and) Aertrycke (north of Thourout)

Good results were obtained, and hits were observed on the Bassin de Chasse, railway station, docks, Bassin Leopold, Frederick Battery and Lock Gates, and a fire was started at junction of Canal and Bassin Leopold at Ostend. Bursts were also observed on the Mole at Zeebrugge and near the lock gates. At Bruges Docks bursts were observed north-east of quay and alongside West Bassin, on Northern Darse, eastern side of dock, on land between North and No. 3 Darses, on the North Quay, and south end of East Bassin. The railway station at Thourout was also hit.

In all nearly 24 tons of bombs were dropped, and all machines returned safely except one, which was hit by anti-aircraft fire over Bruges and forced to land, the machine being subsequently destroyed by enemy artillery. Bombs were also dropped on an enemy vessel.

In addition to the above, the usual patrols were carried out. Enemy machines were sighted and attacked, but no decisive combats are reported.

In home waters, during the same period—unsuitable weather notwithstanding—anti-submarine, escort, and hostile aircraft patrols have been maintained by seaplanes, aeroplanes, and airships. Hostile submarines have been sighted and attacked, enemy mines have been located and destroyed, and Allied and neutral shipping has been convoyed.

June 20th.—A British squadron while on reconnaissance in the north of the Heligoland Bight on the morning of June 19th was attacked by German seaplanes.

No hits were made by the enemy, and one enemy seaplane was brought down and destroyed by gunfire.

June 21st.—During the period June 17th-19th inclusive, to some extent weather conditions have again interfered with naval air operations.

Night and day bombing raids were carried out on the following objectives:—Bruges Docks, Ostend Docks, Zeebrugge, St. Denis Westrem and Maria Aelter Aerodromes, La Brugeoise works, Thourout railway junction, and railway sidings at St. Pierre Capelle (east of Nieuport).

In all, approximately 16 tons of bombs were dropped with good results, bursts being observed on Brugeoise works and the south-west side of Southern Darse, Quai de Paquebots, and Flotilla Wharf, and on a ship three miles off Ostend Dock. At Bruges Docks bursts were also observed north of docks, west of West Bassin, on the submarine shelters and sheds at East Bassin. A hit was obtained at Zeebrugge between the lock gate and Mole, and at Ostend Docks bursts were observed on piers and warehouses, and on sheds and submarine shelters near Bassin de Chasse and Ateliers de la Marine.

Attacks with bombs and small arms ammunition were made on enemy shipping. Two direct hits were observed—one on an enemy destroyer—and other bombs fell very close.

Enemy aircraft attacked two of our bombing formations, and one hostile machine was driven down. All machines returned safely except one, which was forced to descend in Holland, owing to a damaged engine, sustained in an engagement with enemy aircraft. Crew safe.

Despite unfavourable weather conditions, anti-submarine, escort, and hostile aircraft patrols have been maintained by aeroplanes, seaplanes, and airships in home waters during the same period. Enemy mines have been located and destroyed, and hostile submarines sighted and attacked. Allied and neutral shipping has also been escorted.

MILITARY.

G.H.Q. Communiqués.

June 18th, 9.10 p.m.—On June 17th the enemy's machines were active on the northern portion of the British front, and there were many combats in the air, in the course of which we destroyed 25 German aeroplanes, and drove three more down out of control. One hostile balloon was shot down in flames.

The usual observation and photographic work was carried on by our aircraft until stopped by thunderstorms in the afternoon.

Twenty tons of bombs were dropped during the day on the enemy's railway stations, junctions, dumps, and aerodromes, and a further nine tons during the following night.

Five of our aeroplanes are missing.

June 19th, 7.38 p.m.—The weather on June 18th was cloudy, but this did not prevent our aeroplanes from carrying out their work of observing for our guns.

In air fighting we destroyed 15 German machines and drove down five out of control.

Eight of our aeroplanes are missing.

Nineteen tons of bombs were dropped by us during the day. Heavy rain rendered work at night impossible.

June 20th, 9.25 p.m.—Low clouds and rain interfered with flying on June 19th and enemy aircraft showed little activity. Nine German machines were destroyed during the day, and two were driven down out of control.

One of our machines is missing.

June 21st, 7.50 p.m.—On the 20th instant low clouds and rain greatly hampered flying operations.

One enemy machine was brought down, and one of our machines is missing.

June 22nd, 7 p.m.—In spite of adverse weather conditions on the 21st inst., some artillery co-operation, photographic reconnaissances, and patrols were carried out by our aeroplanes.

One hostile machine was destroyed.

Two of ours are missing.

June 23rd, 7.45 p.m.—There was very little enemy activity in the air on June 22nd.

Low clouds and high winds interfered with observation and photography, but work was carried out by our aeroplanes in co-operation with the artillery and a number of hostile battery positions and other targets were engaged.

There were no combats in the air, and none of our machines is missing.

At night the weather improved, enabling our night-flying machines to show greater activity.

During the 24 hours 15 tons of bombs were dropped. Bapaume dump, railway stations at Armentières, Steenwerke, and Bac St. Maur, and Bruges Docks being heavily attacked by our machines.

June 24th, 7.49 p.m.—In the strong winds and low clouds of the 23rd inst. our aeroplanes carried on reconnaissance work and artillery co-operation with difficulty.

There was little air fighting. One hostile machine was destroyed during the day and two of our machines failed to return.

Five tons of bombs were dropped by us during the day and 15 tons on the following night, over six tons falling on the sidings and stations at Cambrai with good effect.

One of our night flying machines is missing.

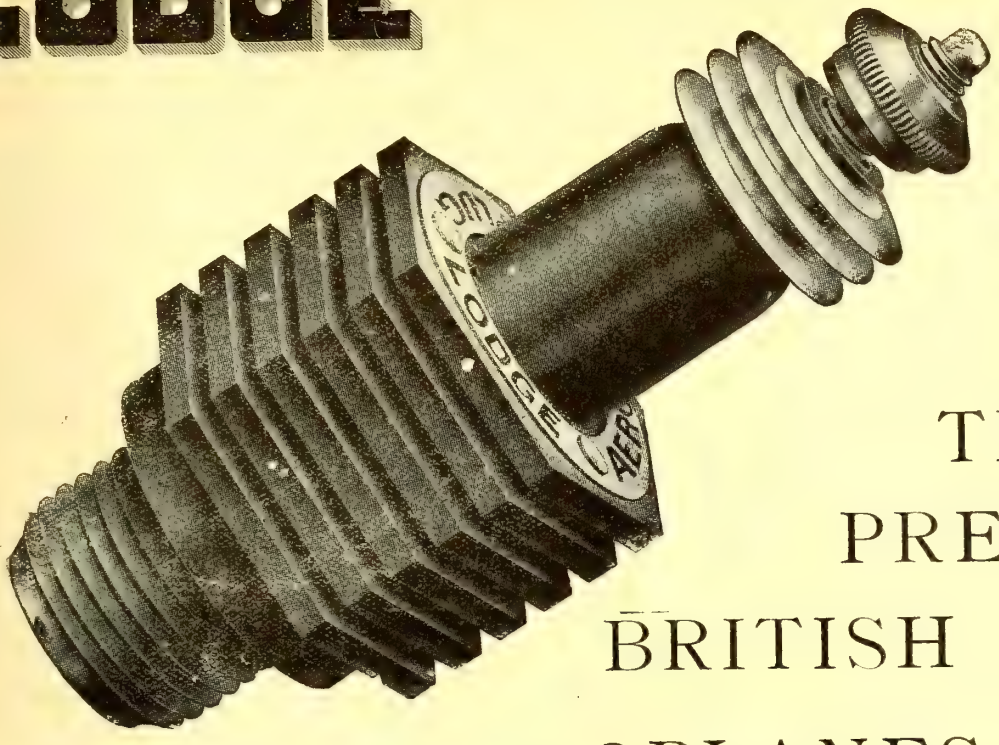
War Office Communiqués.

June 19th.—The G.O.C. Italy reports:—

In the battle of the 15th inst. the Royal Air Force, who were unable to operate on the plateau during practically the whole of the battle owing to the mist, delayed the advance of the enemy across the Piave with their usual gallantry.

The number of enemy aeroplanes destroyed on the 15th inst. was eight, and not ten, as previously reported.

LODGE



THE
PREMIER
BRITISH PLUG
FOR AEROPLANES

ESTABLISHED 1912
CONTRACTORS TO H.M. AIR MINISTRY

THE
SUPERMARINE
AVIATION WORKS, LTD.

DESIGNERS &
CONSTRUCTORS OF FLYING BOATS.

Telephone—WOOLSTON 37.
Telegrams—SUPERMARIN
H. SCOTT-PAINE, DIRECTOR & GEN. MANAGER.

SBAC
THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

OFFICES,—
SOUTHAMPTON, Eng.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

June 20th.—The G.O.C. Palestine reports :—

Imperial and Australian air squadrons executed an extensive bombing raid on El Kutrani railway station (on the Hedjaz Railway, 30 miles east of the south end of the Dead Sea) and the enemy camps in its vicinity on the morning of June 16th. Direct hits were observed on a troop train full of troops and on the enemy shelters. The station buildings were set on fire.

On June 18th a similar raid was carried out on Amman station (25 miles east of the Jordan at the Jericho bridgehead).

June 20th.—The G.O.C. Italy reports :—

Yesterday the weather was fine, and our aircraft were active. Ten enemy aircraft were destroyed, and 1,460 lb. of bombs dropped on various targets. Heavy rain this morning

June 22nd.—The G.O.C. Italy reports :—

Between June 12th and 21st inclusive the Royal Air Force have destroyed 23 enemy aeroplanes. During the same period two of our machines have failed to return.

THE CASUALTY LIST.

MILITARY.

Reported June 20th.

Previously reported Missing, now reported Killed.—Thompson, Capt. P., R.F.C.

Prisoner in German Hands.—Burnard, Sec. Lt. R. A., Lond. R., attd. R.F.C.

Canadian Force.—Accidentally Killed.—Evans, Lt. W. D., Sask. Regt., attd. R.A.F.

Reported June 21st.

Australian Force.—Wounded.—Simpson, Capt. T. L., F.C.

Missing.—Rintoul, Sec. Lt. A., F.C.

* * *

Casualties among N.C.Os. and Men. The Dates are those of the Official List :—

Previously Missing, now reported Died as Prisoners of War in German Hands.

June 12th.—R.F.C.—Postons 29138 1st Cl. Air Mech. H. L. (Hall Green).

Australian Imperial Force.

Died.

June 11th.—A.F.C.—Clutterbuck 1342 T.

Reported June 24th.

Previously reported Missing, now reported Killed.—Millett, Sec. Lt. J. N. L., R.F.C., and R.A.F., Spec. List.

Accidentally Killed.—Lee, Sec. Lt. J. W., S. Wales Bord., attd. R.F.C.

Prisoner in Turkish Hands.—Everard, Maj. A. J., M.C., R.F.C.

Canadian Force.—Killed.—Spencer, Lt. E. D., Can. Rly. Troops, attd. R.A.F.

Previously reported Missing, now reported by German Government Killed or Died of Wounds.—Agar, Capt. E. Z., Alta. Reg., attd. R.A.F.

Harmon, Lt. B. W., M.C., Man. Regt., attd. R.A.F.

Wounded.—Denison, Lt. F. B., Cent. Ont. Regt., attd. R.A.F.

Missing.—Hall, Lt. C. R., Que. Regt., attd. R.A.F.

Kelly, Lt. T. T. S., E. Ont. Regt., attd. R.A.F.

Previously reported Missing, now reported Prisoners in German Hands.—Hustwitt, Lt. S. A., Can. Eng., attd. R.A.F.

Scott, Lt. W. A., Can. For. Corps, attd. R.A.F.

Reported June 25th.

Previously reported Missing, now reported Killed.—Williams, Capt. R. M., R.F.C.

* * *

The following officers, who were prisoners in Switzerland, have now arrived in England :—

Binney, Capt. F. B., R.F.C.; Black, Lt. W., Durh. L.I., attd. R.F.C.; Harle, Lt. W., Northd. Fus., attd. R.F.C.; Orde, Maj. M. A. J., R.F.C.

Canadian Force.—Smith, Lt. L. A., Gen. List, attd. R.F.C.

* * *

The follg. Officers, who were prisoners in Germany, have arrived in Holland for internment :—

Clements-Finnerty, Lt. H., Lancers, attd. R.F.C.; Farmer, Lt. E. R., Yeo., attd. R.F.C.; Graham, Lt. L. N., W. Yorks R., attd. R.F.C.; Long, Lt. H. O., R.E., attd. R.F.C.; McEwen, Capt. J. H. F., Camn. Highrs., attd. R.F.C.; Nichol, Capt. R. W., R.F.C.; Robertson, Sec. Lt. J. G., R.F.C.; Thomas, Sec. Lt. C. I. S., R.F.C.

AIR FORCE.

Reported June 19th.

Killed.—Bolay, Sec. Lt. A. R., R.A.F.
Coffey, Lt. C. R., R.A.F.
Davidson, Sec. Lt. W. D., R.A.F.
Flaveile, Sec. Lt. V. A., R.A.F.
Mitchell, Lt. N. R., R. Scots and R.A.F.
Nugent, Sec. Lt. A., R.A.F.
Willy, Sec. Lt. R., R.A.F.

Wounded.—Birkinshaw, Sec. Lt. J. J., R.A.F.; Brown, Lt. C. W., Middx. R. and R.A.F.; Crocker, Sec. Lt. C. K., R.A.F.; Crozier, Lt. A., R.A.F.; Finke, Sec. Lt. R., R.A.F.; Foxall Smedley, Sec. Lt. F. E. J., R.A.F.; George, Lt. W. A., R.A.F.; Hurridge, Lt. L. H., Royal Fus. and R.A.F.; Layton, Sec. Lt. W. D., R.A.F.; MacLean, Capt. G. J., R.A.F.; Malcolm, Sec. Lt. W. A., R.A.F.; Mair, Capt. W. J., R.A.F.; Mawson, Lt. L., R.A.F.; McKellar, Sec. Lt. D., R.A.F.; Reeler, Sec. Lt. W. L., R.A.F.; Slater, Sec. Lt. I., R.A.F.; Scroggs, Sec. Lt. A. F., R.G.A., attd. R.A.F.; Williams, Sec. Lt. A. T., R.A.F.

Missing.—Gregory, Sec. Lt., R. J., R.A.F.; Magee, Sec. Lt. E. A., R.A.F.; Turner, Capt. H., R.A.F.; Webb, Sec. Lt. G., S. Staffs. R., attd. R.A.F.

Reported June 20th.

Killed.—Allman, Sec. Lt. K. W., R.A.F.
Davey, Sec. Lt. A. V. P., R.F.A. and R.A.F.
Finlay, Sec. Lt. K. N., R.A.F.
Garden, Lt. C. S., R.A.F.
Kemp, Sec. Lt. G. H., Durh. L.I., attd. R.A.F.
Ross, Lt. G. A. B., King's L'pool R. and R.A.F.

Died of Wounds.—Heigham Plumptre, Lt. L. G., Bedf. R., attd. R.A.F.

Wounded.—Box, Sec. Lt. P. D., R.A.F.; Beesley, Lt. A. B., R.A.F.; Bracewell, Sec. Lt. T., R.A.F.; French, Lt. C. M., R.A.F.; Horton, Sec. Lt. C. R. R., R.A.F.; Niven, Sec. Lt. R., R.A.F.; Pocock, Sec. Lt. L. E., R.A.F.; Pratt, Lt. R. G., R.A.F.; Rathbone, Sec. Lt. J., R.A.F.; Smith, P.F.O., H. P., R.A.F.; Tanner, Capt. J. C., R.A.F.; Waller, Sec. Lt. R. P., R.A.F.; Whitehouse, Sec. Lt. S., R.A.F.

Missing.—Forder, Lt. E. G., R.A.F.; Hand, Lt. E. McN., R.A.F.; McGregor Turnbull, Maj. M. R., R.A.F.; Muir, Lt. R. C., R.A.F.; Repton, Lt. C. T., S. Notts Hus. and R.A.F.; Sugden, Sec. Lt. J. E. W., R.A.F.

Reported June 21st.

Killed.—Fish, Capt. W. R., M.C., Suff. R. and R.A.F.
Galvayne, Lt. V. F. A., R.A.F.
Hart, Sec. Lt. E. S., R.A.F.
Lewis, Sec. Lt. J. A. C., R.A.F.
Maltby, Sec. Lt. A. H., R.A.F.
Nightingale, Lt. A., R.A.F.
Owen, Sec. Lt. N., R.A.F.
Rahill, Lt. P. J., Ches. R. and R.A.F.
Tapper, Lt. H. K., R.A.F.
Yuilie, Sec. Lt. W. B., R.A.F.

Wounded.—Bernard, Lt. L. A. A., R.A.F.; Cottle, Lt. J., R.A.F.; Frayne, Lt. O. W., R.A.F.; Greene, Sec. Lt. W. C., R.A.F.; Hamilton, Lt. E., South Irish Horse, attd. R.A.F.; Harris, Sec. Lt. W., R.A.F.; Hinchcliffe, Lt. J. B., R.A.F.; Parker, Lt. V. S., R.A.F.; Saunderson, Lt. H. V., R.A.F.; Van der Ben, Sec. Lt. R. C., R.A.F.; Vincent, Sec. Lt. F. C., R.A.F.; Watts, Lt. H. J., R.A.F.

Missing.—Cunningham, Lt. M. F., R.A.F.; Harvey, Lt. T. F., Sea. Highrs., attd. R.A.F.; Hacklett, Lt. L. A., R.A.F.; McEwan, Sec. Lt. G. C., R.A.F.; Seymour, Lt. L., R.A.F.; Stockins, Sec. Lt. W. J., Lond. R., attd. R.A.F.

Reported June 21st (2nd List).

Killed.—Gange, Sec. Lt. P. H., R.A.F.
Johnson, Sec. Lt. C. M., R.A.F.
Langdon, Lt. J. H., R.A.F.
Neill, Lt G. W., M.C., Leinster R., attd. R.A.F.
Salton, Lt. W. F., R.A.F.
Tyrell, Capt. W. A., R.A.F.

Died of Wounds.—Steggall, Sec. Lt. F. L., R.A.F.

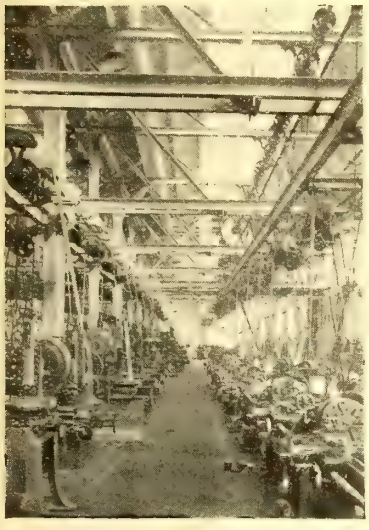
Wounded.—Atkinson, Sec. Lt. J. F. V., R.A.F.; Bailey, Sec. Lt. G., R.A.F.; Campbell, Sec. Lt. W., R.A.F.; Davies, Sec. Lt. J. H. T., R.A.F.; Dixon, Sec. Lt. W. H., Seaforth Highrs., attd. R.A.F.; Duncan, Sec. Lt. G. M., R.A.F.; Ezard, Sec. Lt. G., R.A.F.; Gordon, Sec. Lt. V., R.A.F.; Graham, Sec. Lt. S. W., R.A.F.; Gye, Sec. Lt. H. J., R.A.F.; Hannah, Sec. Lt. W. C., Northd. Fus. and R.A.F.; Hawker, Capt. T. McD., R. Irish Fus. and R.A.F.; Heron, Sec. Lt. O. A. P., R.A.F.; Nesbit, Lt. C. H. F., The Buffs, attd. R.A.F.; Payne, Sec. Lt. S. R., R.A.F.; Pollard, Sec. Lt. R. K., R.A.F.; Rough, Capt. H. L., R.A.F.; Saunders, Lt. J. E., Lancs. Fus., T.F., attd. R.A.F.; Saunders, Sec. Lt. W. W., R.A.F.

Missing.—Baring, Sec. Lt. R. A., R.A.F.; Breckenridge, Sec. Lt. W., R.A.F.; Dodd, Sec. Lt. F. C., R.A.F.; Johnson, Sec. Lt. J. H., R.A.F.; Marsden, Sec. Lt. C., R.A.F.; Manuel, Capt. J. G., D.S.C., R.A.F.; McGee, Sec. Lt. W.R., R.A.F.; Thompson, Sec. Lt. H., R.A.F.; Windridge, Lt. E. A., R.A.F.; Young, Capt. T. V., R.A.F.

Previously reported Missing, now reported Wounded and Prisoner of War.—Hill, Sec. Lt. T. R. V., R.A.F.

Previously reported Missing, now reported Believed Wounded and Prisoners of War.—Brown, Sec. Lt. A. C. G., R.A.F.
Carr, Sec. Lt. C. V., D. of Well. R., attd. R.A.F.
McKelvey, Lt. M. T., R.A.F.
Meredith, Sec. Lt. J., R.A.F.
Pemberton, Sec. Lt. A. L., R.A.F.
Tysoe, Lt. C. G., R.A.F.

Ventilating, Heating and Air Washing Systems.



Equip your factory with Sturtevant Apparatus. It supplies warmth in winter and ventilation through all seasons. It improves working conditions, thus assisting in maintaining production and increasing the efficiency of the workers.

Further particulars are given in Publication W1121, which will be sent on request.

WE SHALL BE PLEASED TO PLACE OUR SERVICES AT YOUR DISPOSAL.

Sturtevant

Engineering Co., Ltd.,
147, Queen Victoria St., London, E.C.4.

VENUS PENCILS

IT is important to know that you cannot buy a faulty Venus Pencil—no imperfect lead is ever sent out of the factory. The lead of all the 17 degrees is brought to the highest pitch of excellence and encased in selected straight-grained cedar wood. These points make for economy.

17 Grades, 6B (Softest) to 9H (Hardest) Blacklead—also Copying.

OF ALL STATIONERS, STORES, ETC., THROUGHOUT THE WORLD

"VENUS," 173/5, LOWER CLAPTON ROAD, E.5.

VENUS

Where Flying Men are fitted out.

AIR-WISDOM.

BEFORE a man sports a squadron-commander's streamers there are few tricks of the air that he isn't up to.

He's just chock-full of weird and wonderful air-wisdom; particularly air-*kit* wisdom, which he ranks highest in importance. For the enquirer's benefit he usually condenses that particular portion of his lore into three words—which he shoots at you and then turns to other things with a that's settled air—"Go to Dunhills."

Go to the people, that is (if he had time to elaborate), who know exactly what your needs are; whose name was a household word amongst motorists years ago when this highly specialised kind of clothing first became a serious necessity; whose unrivalled knowledge of materials and fastenings is at your service, who alone can give you the distinctive Dunhill cut; and who fix their prices with a benevolent eye for your pocket.



Call in, if you can, at our well-known "Base" in Conduit Street—a few paces from Regent Street—to inspect the full kit. Or, if London is "out of bounds" drop a line for patterns and full details which will be sent gladly on request.

Dunhills

LIMITED.

2, Conduit Street, Regent Street, London, W. 1.

Slipper, Lt. R. A., R.A.F.

Previously reported Missing, now reported Prisoner of War.—Wels, Sec. Lt. S. R., R.A.F.

Previously reported Missing, now reported Believed Prisoners of War.—Duce, Lt. W., Ldn. R., T.F., and R.A.F.
Gillan, Lt. C. J., R.A.F.
Harrington, Lt. H. B. D., Ldn. R., T.F., and R.A.F.
Towne, Sec. Lt. L. L. F., R.A.F.

Prisoner of War.—O'Lieff, Sec. Lt. P. H. R.A.F.
Reported June 22nd.

Killed.—Arthur, Maj. J., R.A.F.
Elliott, Lt. H. W., R.A.F.
Heater, Sec. Lt. R. E., R.A.F.
Manuel, Lt. E. G., R.A.F.
Meadway, Lt. B. W., North'n R. and R.A.F.
Sessions, Sec. Lt. F. H. N., R.A.F.
Simms, Sec. Lt. J. B. P., Northd. Fus. and R.A.F.
Simpson, Sec. Lt. T. E., R.A.F.
Talbot, Lt. A., R.A.F.
Wilberforce, Capt. W. R. S., K.R.R.C. and R.A.F.

Died of Wounds.—Paynter, Capt. J. De C., R.A.F.

Wounded.—Bainbridge-Bell, Lt. L. H., R. Muns. Fus. and R.A.F.; Bastin, Sec. Lt. G. H., R.A.F.; Bell, Lt. E., Co. of Lond. Yeo. and R.A.F.; Cheeseman, Lt. V. G., R.A.F.; Cochrane, Sec. Lt. G., R.A.F.; Dewar, Lt. J. F., H.L.I. and R.A.F.; Enright, Lt. P. A., R.A.F.; Feather, Lt. J. L., R.A.F.; Hunter, Sec. Lt. Wm. Alex., R.A.F.; Mann, Lt. L. J., A.S.C., attd. R.A.F.; Miles, Capt. F. H. H., Co. of Lond. Yeo. and R.A.F.; Morton, Lt. A. V., Glouc. R., attd. R.A.F.; Newman, Lt. H. S., Welsh R., and R.A.F.; Nuttall, Capt. F. (M.C.), R.A.F.; Oakley, P/F/O. H., R.A.F.; Sacre, Sec. Lt. H., R.F.A., attd. R.A.F.; Thompson, Sec. Lt. J. F., R.A.F.; Vaughan, Lt. R. C. (M.C.), Shrop. L.I., attd. R.A.F.; Ward, Lt. P. L., R.F.A. and R.A.F.
Reported June 24th.

Killed.—Agerup, Lt. H., R.A.F.
Busby, Capt. V. E. G., R.A.F.
Jones, Lt. F. J., R.A.F.
Link, Sec. Lt. F. L. C., R.A.F.
Marchant, Lt. F. N., R.A.F.
Roper, Sec. Lt. G., R.A.F.

Previously reported Missing, now reported Killed.—Aspinall, Capt. J. V., R.A.F.

Wounded.—Burrell, Lt. H. G., R.A.F.; Eason, Lt. H. R. S., R.A.F.; Farfan, Sec. Lt. J. R. A., R.A.F.; Frederichsen, Sec. Lt. P., R.A.F.; Hall, Sec. Lt. W., R.A.F.; Hamilton, Sec. Lt. J., Sco. Rif. and R.A.F.; Harrison, Sec. Lt. F. H. H., K.O.Y.L.I. and R.A.F.; Haskell, Sec Lt. L. R., R.A.F.; Howdle, Sec. Lt. J. T., R.A.F.; Kennedy, Sec. Lt. K., R.A.F.; McGregor, Lt. G. S., R.A.F.; McIntyre, Sec. Lt. C. W. G., R.A.F.; McIntosh, Sec. Lt. A. N., R.A.F.; Nicol, Sec. Lt. L. V., R.A.F.; Ross, Sec Lt. B. A., R. Berks R., attd. R.A.F.; Smith, Lt. S. C., R.A.F.; Summers, P.F.O. G. B., R.A.F.; Shepherd, Sec. Lt. F., R.A.F.; Taylor, Lt. H. J. H., R.A.F.; Whitman, Sec. Lt. T., R.A.F.; Watts, Lt. E. R., Gordon Highrs. and R.A.F.; Winterbottom, Capt. W. R., Derby Yeo. and R.A.F.

PERSONAL NOTICES.

NAVAL.

Deaths.

PACKE.—Flt. Lt. Robert Christopher Packe, R.N., who was killed on June 21st when on patrol duty, was the elder son of Mr. and Mrs. Vere Packe, of Geldston Hall, Norfolk, and Sulivan House, Falkland Islands. He was 19½ years old.

* * *

Flt. Sub-Lt. E. G. Stocker, R.N.A.S., attd. R.F.C., has been missing since March 27th. Will friends of prisoners of war kindly ask for news of him, which will be gratefully received by Mrs. Stocker, 50, Albany Road, Salisbury.

MILITARY.

Deaths.

BUSBY.—Capt. Vernon Busby, R.A.F., who was accidentally killed while flying over London on June 8th, aged 23, was the eldest son of Mr. and Mrs. George Busby, of Fairfield, Selly Hill, Birmingham. He was educated at King Edward's High School, Birmingham, where he was a member of the O.T.C. He was an expert motor cyclist, and rode in two tourist trophy races. He volunteered for active service abroad on August 6th, 1914, and going to France with the first Expeditionary Force, he was made engineer of his unit. He was wounded in the battle of Mons, and in November, 1914, was given a commission in the Royal Engineers, stationed at Aldershot and at Dunstable, where he held a temporary staff appointment. He was transferred to the R.F.C. in 1915, and again went to France, where he remained until December, 1916, flying every kind of machine in the British Army. An injury to his leg kept him in hospital in this country for several months, and since the early part of 1917 he had been employed at the Air Ministry. During the last few months he was engaged on special flying work.

CAMPBELL.—Lt. Kenneth Turner Campbell, who was killed in aerial combat in France on June 17th in his 19th year, was the only son of Lt.-Col. Spurgeon Campbell, C.A.M.C., and Mrs. Campbell, of Winnipeg, Canada. He was brought up and educated in Winnipeg, where he had many friends. Early in 1917 he followed his father overseas, and was later granted a commission in the R.F.C. He had only recently gone to France, but had already earned recognition for his zeal and devotion.

COFFEY.—Lt. Charles Reay, D.L.I. and R.A.F., who was killed in action on May 27th, was the eldest son of Mrs. Reay Coffey, Kensington. He was 24 years of age.

HAMILTON.—Capt. Herbert James Hamilton, M.C., D.C.L.I., attd. R.A.F., whose death was announced last week, was educated at the Stationers' Company's School. He mobilised with the Artists Rifles in the early stages of the war, and in October, 1914, proceeded to France, where, after 12 months, he was given his commission and drafted into the D.C.L.I. After serving on the Somme for six months he transferred into the R.F.C., acting as observation officer for nearly six months. He obtained his pilot's certificate in the latter part of 1916, and was appointed flight instructor at Montrose. He returned to the front as temporary captain, which promotion was confirmed on November 25th last. On March 21st he rendered valuable service in low flying over the enemy, and was personally commended by the King. For this service he received the M.C. with three other officers of his flight, each being trained by Capt. Hamilton.

HEIGHAM-PLUMPTRE.—Sec. Lt. Leslie Grantham Heigham-Plumptre Bed. Regt., attd. R.A.F., whose death was recently announced, was educated at Westminster and Sandhurst, and was gazetted to the Bedfordshire Regt. in September, 1917, being attached to the R.A.F. three months later. He was wounded on March 22nd and returned to the front on May 19th.

HENDERSON.—Capt. Ian Henry David Henderson, M.C., Arg. and Suthd. Highrs. and R.A.F., was killed on June 21st while on flying duty. He was the only son of Lt.-Gen. Sir David Henderson, K.C.B., D.S.O.

Capt. Henderson, who was only 21 years of age, took his commission in the Argyll and Sutherland Highlanders in January, 1915, and transferred to the Royal Flying Corps in August, 1915. He was gazetted captain in July, 1916.

A memorial service will be held in the Church of St. Martin-in-the-Fields on Thursday, June 27th, at 12.30 p.m.

Ian Henderson was beloved by all who knew him. His personal charm and kindness of heart won for him many friends who will deeply mourn his loss. He had seen much active service, and in addition to displaying great personal gallantry had proved himself to be a pilot of very considerable skill. In him the King has lost an officer of real ability and still greater promise.

The sympathy of all who are concerned with aeronautics will go out to Sir David Henderson and Lady Henderson in the death of their only son.—C. G. G.

One who served with the late Capt. I. H. D. Henderson writes:—

"The death of Ian Henderson has robbed the King of a loyal servant and the Army of a gallant comrade. Those who have served with him know his generosity of mind and his devotion to all that part of military life which concerned practical work in the field. In the trenches or in the air engaged with the enemy he was happy. Home appointments, if they prevented him from flying, had no attraction, however pleasant they might be in other ways.

"All who knew him liked him. His entire lack of rancour and jealousy and his whole-hearted admiration for those who had acquired merit in the field endeared him to all.

"The deepest sympathy is felt for his parents, who have given unreservedly their best to the King and country. There is a tragic coincidence in the fact that Ian Henderson died in and for the service which his father has done so much to organise and to create.—A Friend."

MEADWAY.—Lt. Brian Wilton Meadway, Northamptonshire Regt. and R.A.F., only child of Mrs. Meadway and the late G. H. Meadway, grandson of John Wilton, of Heathlands, Chadwell Heath, and great-grandson of George Wilton, of H.M.S. "Agamemnon" (Trafalgar, 1805), was educated at St. Lawrence College, Ramsgate. He joined the U.P.S. Brigade in September, 1914, received his commission in the Northamptonshire Regt. in January, 1915, and went to France in the following September. He was twice wounded. In September, 1917, he joined the R.F.C. and became an instructor. He was killed on June 4th while flying in Hertfordshire. He was 22 years of age.

PITHER.—Capt. S. C. Pither, K.O.S.B. and R.A.F., who died abroad on June 11th of wounds accidentally received, was the second son of the late Fras. L. Pither, of Tollington Park, N.

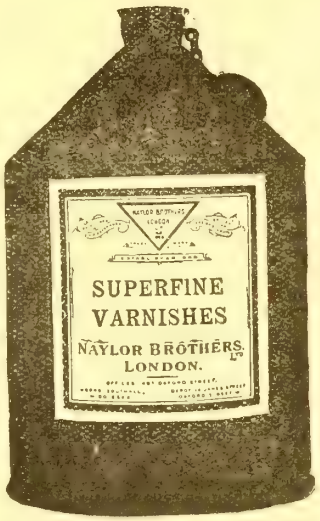
REDLER.—Lt. Harold Bolton Redler, M.C., R.A.F., was accidentally killed on June 21st. Aged 21.

SESSIONS.—Lt. Donald Humphrey Sessions, M.C., R.A.F., who was killed whilst flying in Kent on June 20th, was the youngest son of Mr. and Mrs. Herbert Sessions, Quedgeley Court, near Gloucester.

THE USE OF
NAYLOR'S
Aero Varnishes

WILL ENSURE A PERFECT FINISH

Many years' experience combined with up-to-date methods and scientific selection of materials ensure the production of varnishes unexcelled for durability and reliability.



Some Specialities for Aero Work.

Woodfillers, Stains, Air Screw Varnish, Spar Varnish, Float Varnish, White Copal Finish for Dope, Enamels, Engine Paints, Etc., Etc.

Free Samples for trial on application.

NAYLOR BROTHERS (London) Ltd.
Contractors to all Government Departments.
Offices: 407/9, OXFORD ST., LONDON, W. **Also at SOUTHALL.**

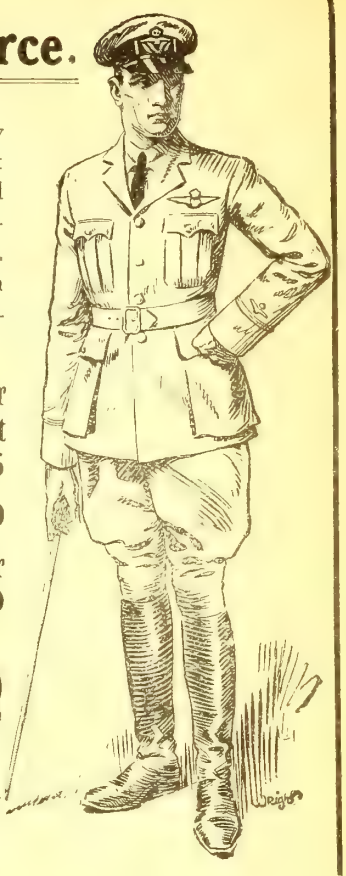
Royal Air Force.

WE supply every requisite, in correct details, for the Royal Air Force. We illustrate the new R.A.F. uniform, correct in every detail and perfectly cut.

Khaki Whipcord or Barathea Service Jacket Prices from **£5/15/6**

Slacks - **£2/10/0**

Cap, Badge, and Bar Complete - **£1/15/0**



Robinson & Cleaver LTD
156-168 REGENT ST.
LONDON, W. 1.

SANKEY

Undershields & other Light Stampings for Aeroplanes

Any size or weight: Rough or Machined: Single piece or Combination pressed and welded by Oxy-acetylene and other processes.

JOSEPH SANKEY & SONS Ltd
Hadley WELLINGTON, Shropshire.

SMALL TOOLS FROM STOCK.

CHUCKS, VICES, HIGH SPEED AND CARBON TWIST DRILLS.



H.S. Taper End Mills.

Die Heads. Morse Sleeves.



Milling Cutters, Slitting Saws.

Machine Nut Taps.
Tapping Attachments.
Shell Reamers. Drill Chucks.
Micrometers. Files.



Hand Reamers.

Dies.



Hack Saws.

Taps, B.A., B.S.F., Whitworth. High Speed Steel, Round and Square.

The Small Tool Supply Co., Ltd.,
Avenue Chambers,
Southampton Row, W.C.1.
Telegrams: "Prosait, West-Cent, London." Telephone: Museum, 2655.

SCOTT.—Lt. Norman Scott, R.F.C., killed in an aeroplane accident at Beverley, was the third son of Police Supt. Scott, of the South Lonsdale Division, Lancashire County Constabulary, the senior police supt. in Lancashire. Deceased was 24 years of age, and a native of Wigan. For five years before the war he was a wireless operator at Toronto. In August, 1915, he joined the 3rd University Corps of Princess Patricia's Canadian Light Infantry, and had been three years in France attached to Headquarters Signalling Staff. In June, 1916, he was awarded the Military Medal for holding to his duties as signaller during a heavy bombardment and maintaining communication with the first line. Afterwards he was wounded, given his commission, and transferred to the Royal Flying Corps.

WILKINSON.—Sec. Lt. Louis Wilkinson, R.A.F., formerly a member of the reporting staff of the "Lancashire Daily Post," has been killed in a flying accident in Scotland. He was a son of the Borough Engineer, Burnley, and joined the Royal Flying Corps upon attaining the age of 18 last October. He received his commission in December, 1917, graduating for his wings in June.

ENGAGEMENTS.

BLOUNT—LEMPRIERE.—The engagement is announced of Lt.-Col. C. H. B. Blount, M.C., The Queen's, and R.A.F., son of the late Maj. C. H. Blount, R.A., and Mrs. Blount, of Felixstowe, and Beatrice Joan, second daughter of the late John Lempriere, of Melbourne, Australia, and Mrs. Lempriere, of 9, Philbeach Gardens, S.W.

MACKAY—HODGKINSON.—A marriage has been arranged, and will shortly take place, between Lt. Lewis Hugh Mackay, the Cameronians and R.A.F., only son of Mr. and Mrs. Lewis G. M. Mackay, of Whitecroft, Beckenham, and Miss Madge Hodgkinson, only daughter of the late W. A. T. Hodgkinson, of Ilkley, Yorks, and Mrs. Hodgkinson, of Wembley Park, Middlesex.

PAYNE—HARVEY.—A marriage has been arranged between Rawdon Shears Payne, R.A.F., late of the R. Ir. Regt., son of the late Capt. Ludlow Payne, of Upton House, Upton, Co. Cork, and Sylvia, daughter of Mrs. C. B. Harvey, East Burnham Lodge, Slough, and the late Maj. C. B. Harvey, R. Hussars.

MARRIAGES.

GODSAVE—POOLE.—On June 18th, 1918, at St. Mark's, North Audley Street, W., Capt. G. Elliot Godsave, London Scottish, and R.A.F., only son of Mr. and Mrs. G. H. Godsave, of South Norwood Hill, S.E., was married to Mildred, only daughter of Mr. and Mrs. Poole, of Athelstan, Honor Oak Park, S.E., by the Rev. F. Barber, Chaplain to the Forces.

ROE—STOPES.—The marriage took place at St. Margaret's Church, Westminster, on June 19th, between Humphrey Verden Roe, Lt., R.A.F., late the Manchester Regt., and Marie Carmichael Stopes, D.Sc., Ph.D., Fellow and Lecturer in Palæobotany at University College, London.

The bridegroom, who was wounded at the front some time ago, is one of the pioneers of aviation, having helped to found the firm of A. V. Roe & Co.; and the bride is well known in the scientific world.

The Bishop of Birmingham (Dr. Russell Wakefield) officiated, assisted by the Rev. Russell Napier, vicar of Old Windsor, uncle of the bridegroom. The bride was given away by Mr Aylmer Maude. Dr. B. Dunlop was best man.

SANSOM—BLEARS-CROCKER.—On June 20th, at St. Luke's Church, Kew Gardens, Lt. William Edwin Sansom, A.F.C., of Melbourne, Australia, was married to Doris Murie Marjorie, daughter of the late W. H. Blears, solicitor, Manchester, and Mrs. Crocker, and stepdaughter of Dr. Crocker, Parkside, Richmond, Surrey, by the Rev. C. H. Dix, M.A.

SPARGO—FURNISS.—On June 18th, at St. Peter's Church Rock Ferry, Cheshire, Lt. William Harvey Spargo, Liverpool Regt. and R.A.F., second son of Mr. and Mrs. W. H. Spargo of Rhodesia, South Africa, was married to Alice Elizabeth, second daughter of Mr. and Mrs. Frederick Furniss, of Rock Ferry, by the Rev. Archibald Ball.

TURNER—BAMFORD.—On June 18th, at St. Thomas's Church, West Hill, S.W., Maj. Ernest Turner, R.A.F., youngest son of the late William Turner, Esq., and Mrs. Turner, of Kingston, was married to Nora, elder daughter of Mr. and Mrs Frederick Linwood Bamford, of 70, Wimbledon Park Road, S.W. by the Very Rev. Canon E. F. Murnane, assisted by the Rev. J Cooney.

BIRTH.

CARTER.—On June 20th, at Dilston, Mumbles, to Millicent wife of A. C. Carter (Capt., Welsh Regt., attd. R.A.F.)—a son.

AIR FORCE.

DEATHS.

BOWICK.—Lt. William Robie Bowick, R.A.F., whose death was announced last week, was the eldest son of J. R. and Isabe Bowick, Bedford. He was 20 years of age.

KITCHEN and COLE.—At a South Coast town on June 22nd verdicts of death from misadventure were returned in the cases of Lt. John Frederick Raymond Kitchen, R.A.F., aged 19, and Sec. Lt. George Cole, R.A.F., aged 26, respectively pilot and observer of a seaplane, who were killed the previous day. The evidence showed that difficulty was experienced with the machine in rising from the water owing to a rough sea. It struck a pier overturned, and fell into the sea, the deaths of the occupant being due to drowning.

MALTBY.—Sec. Lt. A. J. Maltby, R.A.F., was killed on June 21st while flying at Montrose. Whilst in the act of diving the machine fell heavily to the ground. The deceased was a son of Mr. J. H. Maltby, Abingdon, Sandgate, Kent, and was 18 years of age.

NEWTON.—Sec. Lt. Fleming Newton, R.A.F., who was previously reported missing, is now known to have been killed on May 9th. He was the second son of Mr. and Mrs. Isaac Newton of Bayham House, Tonbridge, and was 19 years of age.

PEARSON, MACFARLANE, and FLYNN.—A verdict of accidental death was returned at an inquest in Cheshire on June 21st on Capt. William Reginald Guy Pearson, R.A.F. (late of the R.F.C.), of London; Lt. William Smith Macfarlane, R.A.F., of Edinburgh; and Lt. Vincent Flynn, of New Jersey, U.S.A., who were killed as the result of a collision while flying at a height of 1,000 ft. on June 20th. The evidence showed that Capt. Pearson

Blackburn
"Always at the Front."
The BLACKBURN AEROPLANE and MOTOR CO. Ltd.
LEEDS and HULL
AIRCRAFT

PYROMETERS
For Heat Treatment of all parts of
Aeroplanes and Aeroplane Engines.
Radiation Pyrometers, catalogue P. 17.
Thermo-couple Pyrometers and Electrical Resistance Thermometers, catalogue P. 19.
POST FREE ON REQUEST.
FOSTER INSTRUMENT CO.,
LETCHWORTH, HERTS, ENG.

KINDLY MENTION "THE AEROPLANE" WHEN CORRESPONDING WITH ADVERTISERS.

TERRY

Cable Coverings and Complete Controls —of reliableness



FOR WAR PURPOSES.

CONTROL WIRES are of great tensile strength, and the covering is a flexible tenacious material—that is one colour all thro'—QUITE DAMP-PROOF—and made up in any colour. If desired cables may be armoured—making them fireproof also.

HERBERT TERRY & SONS, Ltd.
The Spring & Presswork Specialists
REDDITCH,
Eng.



(2)

In small and large stone bottles, and in ¼, ½ and 1 gallon drums.

PROMPT DELIVERY AGAINST A CERTIFICATE.



FIRST IN 1880 FOREMOST EVER SINCE.

The quickest drying and hardest Enamel manufactured.

PLEASE SPECIFY "CLUB" BRAND TO ENSURE GETTING OUR GOODS.

Enamels, Lacquers and Varnishes of all Descriptions.

Sole Manufac urers:

SILICO ENAMEL CO.,

NEW CROSS, LONDON, S.E.

When Fitting-up your Works
AND OFFICES
or Contemplating Alterations

SEND TO

THE CAMDEN CONSTRUCTION CO., LTD.

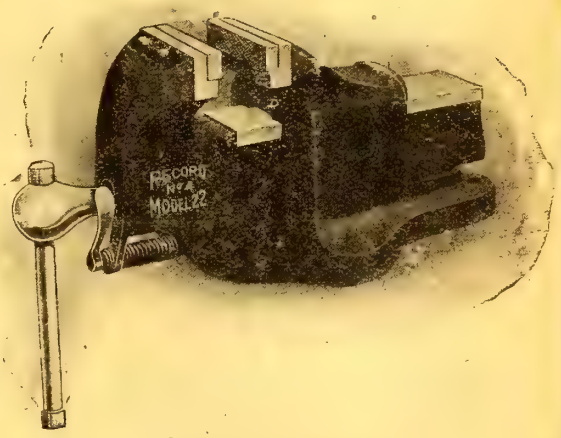
289, HIGH STREET, CAMDEN TOWN, N.W.1,

and a Representative will wait on you, submit a scheme and guarantee a time of com; letion.

Propeller, Engine and other Cases a Speciality.

DISTANCE NO OBJECT.

BENCH VICES



PROMPT DELIVERIES.

C. & J. HAMPTON, LTD.,

SHEFFIELD.

TELEGRAMS: "VICES, SHEFFIELD."

was in a machine with Mr. Macfarlane, and that Mr. Flynn was flying alone. They came together as though practising fighting. Capt. Pearson turned to the right, which was the rule of the Force when flying, but Mr. Flynn turned to the left, and the machines collided, and came to the ground wrecked. Capt. Pearson and Mr. Flynn were killed instantly, and Mr. Macfarlane died a few minutes after being picked up. In a witness's opinion, had Mr. Flynn adhered to the rules, and turned to the right, the accident would not have happened.

STOKES-REES.—Lt. Philip George Stokes-Rees, R.A.F., who died on June 18th as the result of a flying accident, was the son of Admiral and Mrs. Stokes-Rees. He was 19 years of age.

ENGAGEMENT.

WIGRAM—TRUMAN.—A marriage has been arranged, and will shortly take place, between Maj. Cyril Wigram, R.A.F., youngest son of the late Henry James Wigram, of Northlands, Landford, and Olivia Marie, daughter of the late Maj.-Gen. W. R. Truman and Mrs. Truman, of Winterbourne, Bonchurch, I.W.

MARRIAGE.

DIPPLE—BOAZMAN.—On June 18th, at St. Peter's Church, Berkhamsted, Sec. Lt. Eric Dipple, R.A.F., son of Mr. and Mrs. Charles Dipple, Handsworth, Berkhamsted, was married to Alice, daughter of the late Henry Boazman, Acorn Bank, Westmorland, and of Mrs. Boazman, Aycliffe, Penrith.

BIRTHS.

NICOLSON.—On June 16th, at 38, Crediton Hill, Hampstead, N.W.6, the wife of Leslie G. Nicolson, R.A.F.,—a daughter.

NORRIS.—On June 15th, at Morton Vicarage, Gainsborough, the wife of Lt. L. Norris, R.A.F., of a daughter.

* * *

Sec. Lt. C. J. MASON, R.A.F., has been missing since April 21st. Any NEWS of him will be gratefully received by Mrs. Mason, High Street, Wimbledon, S.W.19.

FOREIGN COMMUNIQUES.

FRANCE.

JUNE 18th.—During the last five days 32 enemy machines have been brought down or forced to land. In addition, four German aeroplanes were brought down by the anti-aircraft defences, and three captive balloons were set on fire.

During the same period 22 tons of bombs were dropped, both by day and night, on the railway stations of Soissons, Roye, Nesles, and Chaulnes.

ARMY OF THE ORIENT.—British aviators bombarded the stations on the Seres-Drama line (Struma front), and caused a fire at Furka (west of Lake Doiran).

JUNE 19th.—On June 18th in spite of the cloudy weather, our crews brought down or put out of action six German aeroplanes and set fire to a captive balloon. Our bombers dropped 10 tons of projectiles during the night of the 18th-19th on railway stations, cantonments, and bivouacs in the region of Villers-Franquex, Favorelles, and Fismes.

ARMY OF THE ORIENT.—Allied aviators carried out numerous bombardments. British aviators in addition brought down thr enemy machines.

JUNE 20th.—ARMY OF THE ORIENT.—Two enemy aeroplanes we brought down, one by our artillery, the other by our aircraf which also set on fire a balloon to the north of Ghevgeli.

JUNE 22nd.—An enemy aeroplane has been brought down.

JUNE 24th.—During yesterday five enemy aeroplanes we brought down or forced to land in their own lines in a damage condition.

Fifteen tons of projectiles were dropped on enemy aerodrom in Picardy and on the Aisne, as well as on bivouacs in the regi Chaulnes-Montdidier.

Captain Doullin brought down his 20th machine. Captain Sevin accounted for his 10th.

GERMANY.

JUNE 19th.—Yesterday, 23 enemy aeroplanes and three capti balloons were shot down. Capt. Berthold achieved his 35 aerial victory, and Lt. Veltjens his 22nd.

JUNE 20th.—Capt. Berthold achieved his 36th aerial victory.

JUNE 21st.—The large, clearly-marked hospital buildings the valley of the Vesle, between Breuil and Montigny, which we formerly used by the French, have recently twice been the obje tive of enemy air raids.

JUNE 22nd.—An enemy air raid on Bruges has caused casualti to the population.

Lt. Loewenhardt has gained his 28th aerial victory.

JUNE 24th.—Lt. Udet attained his 31st and 32nd aerial victorie Ober Lt. Goehring his 20th and 21st.

AUSTRIA.

JUNE 20th.—The co-operation in the fighting of battle aviato and of the reconnoitring service are mentioned in the troop repo with special praise. Among our battle aviators Capt. Brumowo

The "Evertrusty"

ASBESTOS

Suits, Gloves,
Masks Leggings,
Gauntlets, Mitts,
Pilot's Knee Guards, &c.



SOLE MAKERS:
WALLACH BROS., Ltd.,
49 TABERNACLE STREET,
Aberdeen and Glasgow. LONDON, E.C.2.
'PHONE: LONDON WALL 3796.

HIDE GLUES FOR AIRSCREWS AND AIRCRAFT CONSTRUCTION.
— APPROVED —
Manufacturers—Wm. OLDROYD & SONS, Ltd., 9, Mincing Lane, London, E.C.3.
Telephone: 4978 Avenue

'FEARLESS' ENGINE CLEANING BRUSHES
As used by the R.F.C.

Send Trade Card for FREE SAMPLE.
FEARLESS BRUSH CO., LTD., 4, NORTHWOLD RD., LONDON — N.16.

Auster LTD
for AUSTER-TRIPLEX SHIELDS
AERONAUTICAL ACCESSORIES
LONDON: 133, Long Acre, W.C.
Telephone: Regent 5910.
Telegrams, "Winflector, London."
BIRMINGHAM: Barford Street.
Telephone: Midland 2123
Telegrams: "Auster, Birmingham."

J.B. Brooks & Co. Ltd

Contractors to the Admiralty, War Office, Air Board, Ministry of Munitions, etc.

And the Leather Specialists with the Largest Works, Finest Equipment, Best Facilities, and widest experience in the Trade, invite enquiries for Articles, Parts, Fitments and cases of

LEATHER

J.B. Brooks & Co., Ltd.
Great Charles Street, Birmingham.

16

Dials

WE give special attention to the production of satisfactory Dials and Instruction Plates in highest grade materials.

We make literally to any specification—in colour, shape, wording or size, any quantity desired, and in any metal besides ivory, ivoroid and bone.

∴ ∴ ∴ ∴

A.I.D. Examiners resident at our works.

OFF OFF

British Metal (Kingston) Ltd.
Kingston-on-Thames, England

Bowden, Tyseley

BOWDEN TYSELEY

We manufacture
CONTROLS & CABLES
suitable for all possible Aeroplane purposes.

Quotations submitted on request.

Note Address:—
The BOWDEN BRAKE CO., Ltd.
TYSELEY, BIRMINGHAM.

Controls AND Cables FOR Aeroplanes

R.H.S.

THE
Eastbourne Aviation Co. LTD.

ESTABLISHED 1911

THE EASTBOURNE AVIATION CO LTD

AEROPLANE CONSTRUCTORS
Contractors to the Admiralty

S.B.A.C. THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS

TELE { GRAMS: Aircraft / PHONE: 1176 } EASTBOURNE

sky achieved his 33rd and 34th aerial victories. First Lieut. von Linke Crawford his 25th, and First Lieut. Fiala his 23rd.

June 22nd.—Between the 15th and the 20th inst. the enemy lost 42 aeroplanes owing to the activity of our aviators and of our anti-aircraft guns. He also lost four captive balloons.

ITALY.

June 18th.—The violence of the battle somewhat decreased along the mountain front, but is increasing along the Piave.

The aviators tirelessly continued to participate effectively in the battle, notwithstanding heavy rain.

June 20th.—From dawn to sunset our own and Allied aviators and the seaplanes of the Italian Royal Navy, all active in chasing, in not allowing the enemy to approach our lines, in observation for the other arms, in carrying out bombardments and attacking the enemy with machine-gun fire, participated uninterruptedly and effectively in the battle. Fourteen enemy machines were brought down. One of our aviators did not return. Along the whole front the observation balloons co-operated usefully and courageously.

June 21st.—The aviators, in spite of adverse atmospheric conditions, carried on their usual activities. Enemy machines were brought down. For the first time our aviators and those of the Allies had as their companions American pilots, who, as soon as they arrived on our front, wished to participate in the battle. The valiant Maj. Baracca, who had achieved his 34th victory in the air, did not return on the 19th inst. from an heroic war flight.

June 22nd.—Ten enemy aeroplanes and three captive balloons were brought down.

June 23rd.—Our own and Allied aviators continued the struggle with undiminished daring. Yesterday they also carried out big and effective bombardments on the immediate lines of communication of the enemy. Ten enemy machines were brought down. Lt. Flavio Baracchini gained his 29th victory.

The aerial losses suffered by the enemy since June 15th amount to 95 aeroplanes and six captive balloons.

June 24th.—The Naval General Staff announces:—Our seaplanes yesterday bombed Durozzo. A direct hit was secured on a large steamer, and fires were seen to break out near the enemy's sheds. In spite of lively anti-aircraft fire, all our machines returned safely to their base.

This morning (June 24th) the aerial bombardment of Durozzo was repeated with greatly successful results. At the same time British machines on a reconnoitring flight over Cattaro engaged enemy machines which had gone up in pursuit and hit one, which was seen to crash out of control. All the British and Italian machines returned safely.

U. S. A.

June 19th.—Last night our aviators were again successful bombing the railway yards and tracks at Conflans.

THE WAR IN REVIEW.

Interned in Holland.

The "Telegraaf's" Flushing correspondent reports on Jun 18th that Lt. George Brenton Coward and John Fountain Read British aviators, who descended near Souburg, Zeeland, informe him that they bombarded Zeebrugge on June 17th. They ha thrown their bombs and were returning, when four Germa machines barred their way. They gave battle. The fight wa furious, and suddenly a shot hit the English machine. The mot worked badly, the oil tank leaked, and petrol ran out of th machine, and there was danger that the aeroplane might take fir The Germans, certain of their prey, redoubled their attacks. Th British pilot realised that it was impossible to reach his own line As they approached Holland they were fired at by Dutch gun shrapnel flying into and around the machine. They continue however, to make for neutral territory, and the Germans saw the escape.

The Cavalry of the Air.

All reports speak of the assistance which Italian aeroplan rendered in the routing of the Austrian forces in the Piave battl much low-flying being done when the retreating enemy wa machine-gunned and bombed as he crossed the river. Also Italia aeroplanes bombed the retreating enemy in advance of the cavalr

A PRESENTATION.

A pleasant ceremony took place at the works of Handley Pag Ltd., after working hours on June 24th, when the employe presented a wedding gift to Mr. F. Handley Page, C.B.E., an his bride.

Mr. Meredith, who took the chair, opened the proceedings wit a few words about Mr. Handley Page's services to aviation fro the time before Bleriot flew the Channel.

The task of reading the illuminated address and of presentin the gifts fell to Miss Dyter, the Lady Welfare superintenden who performed the office charmingly, adding a few sincere wor of felicitation on behalf of the women workers. Mr. Handle Page then replied on behalf of his wife and himself in a spee which struck exactly the right note, and which was receive with acclamation.

With a vote of thanks to the chairman and an admirable rep followed by three cheers for Mr. and Mrs. Handley Page wit musical honours the cheery little ceremony ended.

The presents included a silver tea service, coffee pot and cup silver rose-bowl and cigarette case.

"ULSTER" FANS
FOR ALL PURPOSES.
Forced and Induced Draft on Boilers. Fumes Removal. Dust Collection and Removal. Cooling Engines on Test. Drying and Ventilation.

HEATING. Please ask for particulars of the most approved systems of Heating as applied to Aircraft Shops. Hot-Water. Steam. "Ulster" Stoves.
We Guarantee Success. Our 50 years' experience is at your disposal.

MUSGRAVE & CO., Ltd.,
Manufacturing Engineers,
BELFAST, LONDON, MANCHESTER, CARDIFF.

TO ENSURE ECONOMY AND EFFICIENCY
SPECIFY
VICTOR FLEXIBLE BACK BLADES

EVERY BLADE COUNTS.
VICTOR SAW WORKS
(CANADA) LIMITED,
283, WEST STREET, FINSBURY CIRCUS, E.C. 2.

E·K
INSULATED WIRES

ELECTRIC
CABLES
No. IIIA
SPECIAL MAGNETO CABLE
PASSED THE HIGHEST TEST OF THE A.I.D.
FLEXIBLES SPECIALLY MADE FOR MOTOR CAR AND AERO ENGINES
EST 1901
Regd No. 662827

E. KALKER & Co
COVENTRY



Class 6 Imperial Acetylene Welding Plant.

OXY-ACETYLENE
PLANTS

IMPERIAL LIGHT LTD.,
123, Victoria Street,
LONDON,
S.W.1.
Telegrams—"Edibrac, Phone, London."
Telephone—Victoria 3540 (3 Lines)

AEROPLANE

RUBERY, OWEN & Co
TELEPHONE No. 87. DARLASTON
TELEGRAMS ROOFS DARLASTON
TRADE R.O.&Co MARK
DARLASTON. SOUTH STAFFS

ACCESSORIES
7 Years' Experience.

Metal Components

ABSOLUTE accuracy to design, careful finish and entire reliability are the points on which we concentrate in our production of sheet metal components for aircraft.

We make complete sheet metal components, riveted, sweated, brazed or welded, for R.E., F.E., B.E., S.E., De H.

:: :: :: ::

A.I.D. Examiners resident at our works.



British Metal (Kingston) Ltd.
Kingston-on-Thames. England

CONTRACTORS TO WAR OFFICE, ADMIRALTY AND AIR BOARD.
'Phone—East 3331 (2 lines). Wires—Dayhur, Phone, London.



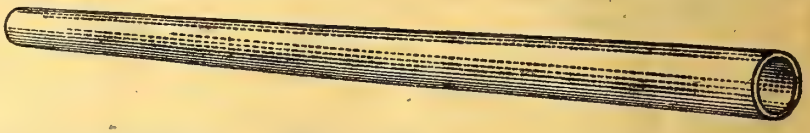
STEEL STAMPS





And MARKING ROLLERS for all descriptions of Aircraft Parts.
BRANDING IRONS. Inks and
STENCIL PLATES. Brushes.

JOHN MEERLOO & SONS,
CLEVELAND STREET, MILE END, LONDON, E. 1.



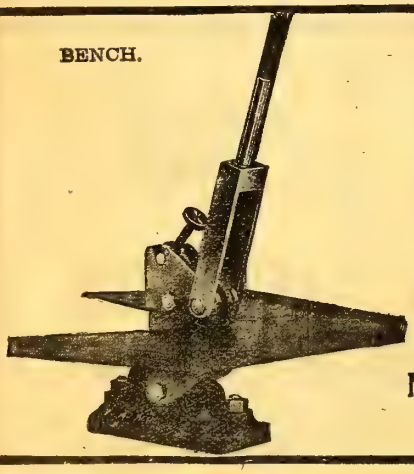


Patent No. 4704/15.

McGRUER SPARS
are THE ACME of
STRENGTH and LIGHTNESS

Particulars from :—
McGRUER BENTWOOD HOLLOW SPAR Co.,
Commercial Wharf, Lambeth, LONDON, S.E.1.

BENCH.



TANGENT
SHEET METAL SHEARING
APPLIANCES
PATENT
Self-Feeding. Fast-Cutting.
Blocks illustrate a combined portable and bench tool for sheets up to 3/32" — steel, and ¼" softer metals.
Other types also made, including portable hand tools for Corrugated Iron.
SAMPLE TOOL SENT ON APPROVAL.

WRITE FOR DESCRIPTIVE PAMPHLET.
MONTGOMERY, SMITH & CO. LTD.
Patentees and Manufacturers,
KEYNSHAM, SOMERSET.



PORTABLE.

THE SIBERIAN & GENERAL TRADING CO., LTD.

Can supply from stock or for prompt shipment

PLYWOOD

IN ALL WOODS, SIZES AND THICKNESSES.

SPECIALITY: BOARDS FOR AIRCRAFT WORK.

HEAD OFFICE: 33, BISHOPSGATE, LONDON, E.C.2.
Telegrams—Wolosey, Led, London. Telephone—London Wall 3577.



E. R. Calthrop's Aerial Patents, Ltd.
Eldon St. House, Eldon Street, London, E.C.2

Telephone (2 lines)—
LONDON WALL 3266 & 3267.

Telegraphic Address—
"SAVEMALIVO, AVE, LONDON

EX STOCK

We can deliver immediately large quantities of any of the undermentioned Aircraft Fittings :—

Descriptions.	*A.G.S. No.*	*Prices from*
Washers -	161 A.C.D. -	4/6 per gross.
Ferrules -	156C. (14 G.)	2/9 ,,
Thimbles -	136 A.B.C.D.	1/11 ,,
Eyelets & Washers	232 B.C. -	1/3 ,,
Strainers -	4 x 44 (d.e.) -	1/9 each.
Shackles -	158 F. - -	1/4 ,,
Split Pins -	1/16" x 1/2" -	8½d. per gross.
,, ,, -	1/16" x 3/4" -	9½d. ,,
Nuts - -	116 A. -	16/6 ,,

Special Machine and Repetition Work carried out in our own Shops.

AEROPLANE GENERAL SUNDRIES, LTD.

Telegrams; ZEPPISKOUT, HOLBORN, LONDON. Telephone; HOLBORN 4959. Offices: FULWOOD HOUSE, FULWOOD PLACE, HIGH HOLBORN, W.C

A.G.S. WASHERS

Wire Work.

Turn Buttons.
Eyelets.
Washers.

THIMBLES

UNION NUTS & NIPPLES.

W. H. BRISCOE & Co., Ltd.,
51, 52, 53, PARK STREET, BIRMINGHAM.

Tel.: 550 Central
Tel. Ad.: BRISK, BHAM.

THE MIDLAND MOTOR CYLINDER Co. LTD.

SMETHWICK — NR. BIRMINGHAM

TELEPHONE—289 SMETHWICK — TELEGRAMS—RAFWORK, SMETHWICK

SPECIALISING IN

AERO ENGINE CYLINDERS IN IRON AND ALUMINIUM TO PASS ALL GOVT. TESTS

WE HAVE THE LARGEST OUTPUT OF AERO-ENGINE CYLINDER CASTINGS OF ANY BRITISH MAKER

AIRSHIPS, LTD.

Manufacturers of Airships and Kite-Balloons

Contractors to the Admiralty

London Office:
27, BUCKINGHAM GATE, S.W.1.
Telephone:—VICTORIA 3688.

HIGH ST., MERTON, and HENDON



THE
Beverley Engineering Works

Aeroplane Cylinders
Clerget Le Rhône Gnôme



WILLOW AVENUE, BARNES, LONDON. 'Phone: Putney 178

The **LARGEST** and most Up-to-date
CIVILIAN SCHOOL
in ENGLAND.

LEARN TO FLY at BOURNEMOUTH

IMMEDIATE VACANCIES.

12 Solo and Dual Aeroplanes in USE. Over 20 other Aeroplanes and Engines in stock.
School Approved by R. Ae. Club.
PUPILS COACHED FOR THE ROYAL AIR FORCE.
Particulars from **BOURNEMOUTH SCHOOL OF FLYING, BOURNEMOUTH.**

"NOVELLON" DOPE
AND AEROPLANE VARNISH.
CELLULOSE ACETATE & CHEMICALS

BRITISH CELLULOSE & CHEMICAL MANF'G. COMPANY, LIMITED,

Telegrams:
"Cellulate, London." **8, WATERLOO PLACE, S.W.1.** *'Phone: Regent 4045.*
Also at Spondon, Derby; and Maybury Gardens, High Road, Willesden Green. N.W.10.
(Telephone: Willesden 2380.)

'Phone 3373 Museum.

Aircraft

National Aircraft Mfg. Co., Ltd.,
15, Drummond Crescent,
Seymour St., Euston Rd., London, N.W.1.

TIME

SILVER SI
ENGLISH
WALNUT & MAHOGANY

THE SOCIETY OF BRITISH AIRCRAFT CONSTRUCTORS S.B.A.C.

JOSEPH OWEN & SONS
Limited
BOROUGH, LONDON, S.E.1,

Telephone: Hop 3811. Telegrams: "Bucheron Sedist."

The demand for National Service of our entire output of the famous Bowden Wire Mechanism—which provides the perfect method of transmitting power by a tortuous route—prevents our acceptance for the present of any orders except those classified under a high priority.

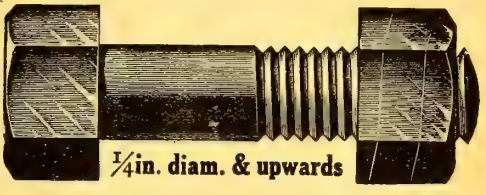
Established 1897

TRADE MARK

Bowden Wire Ltd.
LONDON
VICTORIA ROAD
WILLESDEN JUNCTION N.W.10

Godbolds

BRIGHT BOLTS & NUTS



¼in. diam. & upwards

(Suitable for Every Description of Engineering Work)

QUALITY, ACCURACY AND FINISH GUARANTEED

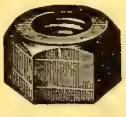
THE

"HELICOID" LOCK-NUT

(THE FINEST LOCK-NUT IN THE WORLD.)

This nut will remain secure, no matter how great the vibration may be—in fact vibration actually tightens the grip.

(made from ⅛in. to 2½in.)



(sample nut & prices on application)

We also manufacture Wrought Iron Railing and Gates, etc.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
London Offices: 139/141, CANNON ST., E.C.4.

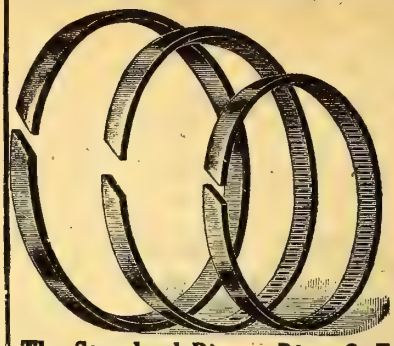
...NKS AND COWLS.

...RKMANSHIP.
...DESPATCH.—

...TILATING Co. Ltd.,
...AD, BRISTOL.

Telegrams:—"ZEPHYR," BRISTOL.

Cast-Iron Hammered Piston Rings.



(By the Davy-Robertson-Process).
In our Special Piston Ring Iron. All sizes up to 72 in.
Quick Delivery.
Absolutely Reliable.
Low Prices.
Telephone No. 2149.
Telegrams—"Ocean," Sheffield.
The Standard Piston Ring & Engineering Co., Ltd.
Don Road, Sheffield.

Y.E.S. Telegrams: Y.E.S. LEEDS. Y.E.S. Telephone: 25004 LEEDS.

Y.E.S. PHOSPHOR BRONZES
(Cast by 'Eatonia' Process).
Y.E.S. B.8. BRONZE
(Under A.I.D. Inspection).
PERFECTLY ROUND SMOOTH BARS, for Automatic Machines, up to 3' 6" long.
THE MOST DURABLE YET PRODUCED.
SOLE PRODUCERS AND SELLERS:
YORKSHIRE ENGINEERING SUPPLIES, Ltd.,
WORTLEY, LEEDS.
Y.E.S. Y.E.S.

THE POOLE AVIATION CO.
POOLE, DORSET.
Contractors to H.M. Government.
Spares and all Parts of Machines.
ENQUIRIES INVITED.
'Phone: Poole 54. 'Grams: Aviation, Poole.

THAMES BANK (BLACKFRIARS) IRON Co., Ltd.
THE
Upper Ground St.
LONDON, S.E.
SPECIALISTS IN
HEATING AND VENTILATING
Factories, Hangars and Doping Shops.
TELEPHONE: HOP 763.
TELEGRAMS: "HOT-WATER FRIARS, LONDON."

CHANDELIER CHAIN
FOR ALL PURPOSES.



Dozens of Sizes. Buy from Actual Makers.
Also all kinds of
PRESSINGS, STAMPINGS & PIERCINGS.
SMITH AND DAVIS, LIMITED.
BRASSFOUNDERS, BIRMINGHAM.

CRADOCK'S STRANDS & CABLES
Manufactured from Tinned Steel Wire of the Highest Quality.
CONTRACTORS TO HIS MAJESTY'S GOVERNMENT.
GEO. CRADOCK & CO., Ltd. Head Office WAKEFIELD. London Office: 7, East India Avenue.

Lang Propeller LTD.
Contractors to the Admiralty and War Office.
WEYBRIDGE, SURREY.

HOPTON & SONS
(HOPTONS)

GEORGE STREET, EUSTON SQUARE, LONDON, N.W. 1 & UNION WORKS, MARKET HARBORO', LEICESTERSHIRE.—

PIONEER TIMBER MERCHANTS AND BENT TIMBER MANUFACTURERS OF

AEROPLANE PARTS

Telephones— Museum 496. Mkt. Harboro' 13.

ESTABLISHED 1840.

Telegrams— Hoptons, Eusquare, London. Hoptons, Mkt. Harboro.

THE CAMDEN CON

Manufa

WOOD P

UNI'

AERO

DELIVERIES GUARAN

289, High Street,

The Best Piston Rings



Scientifically designed. Made from high tensile cast iron and hammered to give an even radial distribution of pressure. Gastight. Sizes up to 30 in. diam.

The BRITISH CHUCK & PISTON RING CO. LTD. Holbrook Lane, COVENTRY.

"CRU

LIQUID GLU

as adopted by H.M. Department of Aeronautical Supplies for Aircraft Construction,

THE IMPROVED LIQUID GLUES COMPANY, Ltd
Great Hermitage Street, London, E.1.
'Phone: Avenue 3178. Tel.: Excroiden, 'Phone, London

Aeroplane Steel Sheets
as supplied by us to
The Royal Aircraft Factory
and leading Aeroplane Makers

Guaranteed to comply with the R.A.F. No. 9A specification. Stocked in all gauges. (Sheets are passed and stamped by the "A.I.D.")

BERNARD NICKLIN & CO.

SMETHWICK, BIRMINGHAM

Telegraphic Address: "Bernico," Birmingham. Telephone No.: 324 Smethwick.

The Air Navigation Co., Ltd.

BLERIOT & SPAD,
ADDLESTONE (SURREY).

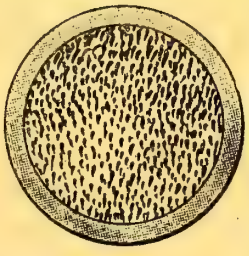
Contractors to War Office and Admiralty.

Flying Ground — Brooklands Aerodrome.

NORBERT CHEREAU, Managing Director,

Telegrams—Bleriot, Weybridge. Telephone—353 Weybridge.

ANTOL CASE HARD



Harden your Screws and Gauges with ANTOL.
IT LEAVES NO SCALE.

PIDGEN BROS.
25, Helmet Row, Old St., London, E.C.1.



TRADE CARDS.

SPECIALISTS

SONS, Ltd.,
ON, S.E.
BUCHERON, SEDIST,"

GODBOLDS
for GOOD Advertising
GODBOLDS' 8 Breams Buildings
LONDON E.C.4
Ernest H. Godbold, Director

ENQUIRIES.
quick production
& Bench Work.
nce to you. ::
ELEC. Co., Ltd.
HAMPTON HILL, MIDX.

FREDERICK WARD,
Full Right Up With Machine Work,
CAN STILL UNDERTAKE PATTERNS AND
SMALL HIGH-CLASS ASSEMBLIES, MACHINE
PARTS TO BE SUPPLIED
ALLSOP ST., UPPER BAKER ST., N.W.
'Phone—PADDINGTON 4743.

PLATES.
ALISE IN EVERY DESCRIPTION OF
PLATES IN METAL, VORINE, ETC.
CLEGG METAL ENGRAVING CO.,
CHATSWORTH WORKS, WORTHING.

PEGAMOID BRAND LEATHER CLOTH.
The Best Waterproof Covering for Railway, Tramway, Aeroplane, Motor Boat, Cushions, Seats, etc.
Sole Manufacturers: NEW PEGAMOID LIMITED, 134, Queen Victoria St., London :: :: E.C.4.
Telegrams—Pegamoid, Phone, London.
Telephone—City 9704 (2 lines). Cables A B C 5th Edition and Private.

Springs! Springs! Springs!
We make a speciality of
Springs for Aeroplanes.
SEND FOR PRICES.
Dart Spring Co., West Bromwich.

P.D.V. Aircraft Company, Ltd.
All Metal Parts for Aircraft made, comprising the following machine work: Milling, Turning, Shaping, Press Work, Slotting, Drilling, Grinding and Sheet Metal Work. Well-equipped Welding and Brazing Plant.
Enquiries to P.D.V. AIRCRAFT COMPANY, Ltd.,
Offices: Princes Street, Richmond, Surrey.
Telegrams: Asres, Richmond. Telephone: 1681 Richmond.

TIMMS ENGINEERING WORKS
Makers of Jigs, Fixtures, and Special Tools; also Aero Engine Components and Gearing in quantities.
8a William St., West Kensington, w.14

NAME PLATES and LABELS
AEROPLANE INSTRUCTION { PLATES, DIALS, SCALES, &c.
MACHINE AND CHEMICAL ENGRAVING AND STAMPINGS.
ALBION M.M. Co, 68, VICTORIA ST., S.W.1.

Chauvière's famous Integral Propellers
HOLD ALL RECORDS; USED BY ALL LEADING AVIATORS. THE BEST
Sole Proprietors for Great Britain and Colonies
THE INTEGRAL PROPELLER CO., LTD.,
Edgware Road, The Hyde, Hendon, N.W. 9.
Telephone—Kingsbury 104. Telegrams—"Aviprop, Hyde, London."

EBORA PROPELLER COMPANY LTD
Ebora
P. PROPELLERS
Contractors to the ADMIRALTY & WAR OFFICE
11 & 12 SURBITON PARK TERRACE, KINGSTON-ON-THAMES
Telephone: KINGSTON 672 Telegrams: "EBORA, KINGSTON"

SCREW-DRIVING
RUSSELL BROTHERS, Ltd., REDDITCH
MACHINES.

Trade MENDINE Mark.
LIQUID SCOTCH GLUE
USED BY THE LEADING AEROPLANE CONSTRUCTORS.
MOISTURE PROOF
Write for Price List and Particulars
MENDINE CO., 8, Arthur Street, London Bridge, E.C.

MISCELLANEOUS ADVERTISEMENTS.

SPECIAL PREPAID RATE: 18 words 1/6; Situations Wanted ONLY, 18 words 1/-; 1d. per word after. TRADE ADVERTISEMENTS in these columns, 3 lines 3/-; 10d. per line after. Public Announcements, Legal Notices, Auctions Contracts, etc., 1/6 per line For the convenience of Advertisers, replies can be received at the offices of "THE AEROPLANE" 166, Piccadilly, London, W.1

PATENTS.

...E & ROWLANDSON, Chartered Patent ...nts (Consulting Engineer, Mr. S. E. ..., A.M.Inst.C.E.), 27, Chancery Lane, ...lon, W.C. Tel. 332 Central.

...y Skerrett (H. N. Skerrett, A.I.A.E., ...Mech.E., Associate I.E.E., Fellow of the ...tered Institute of Patent Agents) Patents, ...ns and trade marks.—24, Temple Row,

Agent, ...ttorney,

...uilders, ...ence of ...btaining ...am dis- Govern- ...o miles ...etter to Picca-

...rawing ...ampton ...k need ...nt Ex-

...anufac- small Full ...l when ...overn- your ...ioning

...quired, ...rate of ...e than ...overn- THE

...oughly ...parts. ...siding ...gaged ...x No. ...V.1. ...diately ...n dis- ...CRLC- ...GINE ...d pre- ...evious and ..., com- ...l take ...ly on Apply, ...egory,

...lowest wage accepted, to your ...rest Employment Exchange, quoting this ...er and No. A.5455.

...e Draughtsmen required for experimen- department of aircraft works, London, ...V. Permanent positions and good salary ...competent men. No one residing more ...n 10 miles away or engaged on Government ...k need apply.—Box No. 3683, THE AERO-

...arts for aero- ...nks and fair- ...esiding more Government THE AERO-

...good wages ...al man, and ...om London. ... miles away ...ons must be ...oyment Ex- ... No. 3696.

Fuelage Erectors for DeH. machines wanted. Those already engaged on Government work or living more than 10 miles away need not apply.—Ruffy, Arnell, and Baumann Aviation Co., Ltd., Noel Road, Acton, W.3.

Panel Beaters for aeroplane work. Best rates paid. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3705, THE AEROPLANE, 166, Piccadilly, W.1.

Charge Hand sheet metal workers, used to cowling, etc. No one residing more than 10 miles away or engaged on Government work need apply.—Box No. 3706, THE AEROPLANE, 166, Piccadilly, W.1.

Wanted Immediately

AERO ENGINE WORKERS

Universal Grinders. Tool Fitters.
Turners. Fitters. Viewers.
Tool Room Hands.

EXCELLENT PROSPECTS. BEST RATES and BONUS PAID. No one on Government work or resident more than 10 miles away need apply. [illegible]

GILLETT, STEPHEN & Co., Ltd.,
BOOKHAM, SURREY.

ESTAB. 12 YEARS.

THE COUNTY WELDING WORKS CO.,

'Phone: Romford 87. **ROMFORD, E.**

IN STOCK

D H. 4.9.9.A 10.
OR FEW DAYS.

PRESSINGS
WELDED FITTINGS

6665, 13027
6666, 13766
6493, 13767
13025, 13737
13095, 13742
10522, 13816
&c., &c., &c.

Wanted for national aircraft factory, practical men for rate-fixing and processing department. Drawing office experience desirable, but not essential. No person already on Government work will be engaged.—Apply to your nearest Employment Exchange, quoting A.5555.

First-class Spindle Hands, thoroughly used to aircraft work, required for Government controlled establishment in London area. Top rate of pay for good men. No one residing more than 10 miles away or already on Government work need apply.—Box No. 3711, THE AEROPLANE, 166, Piccadilly, W.1.

Shorthand-Typist. A competent operator, male or female, required immediately, permanent situation, must be able to work without close supervision.—Apply by letter, stating age, experience, and salary required, to General Manager, Fredk. Sage and Co., Ltd., 58/62, Gray's Inn Road, London, W.C.1.

Planning and Progress.—Good man required to take charge of these departments in aeroplane factory, London district; practical experience essential, and good organising ability. Good salary to right man. No person resident more than 10 miles away or on Government work need apply.—Reply, stating age, full particulars of qualifications, and experience and salary required, to Box No. 3708, THE AEROPLANE, 166, Piccadilly, W.1.

Planning and Progress.—Good assistants required with both clerical and workshop experience in large aeroplane factory, London district. No person resident more than 10 miles away or on Government work need apply.—Reply, stating age, full particulars of experience, and salary required, to Box No. 3707, THE AEROPLANE, 166, Piccadilly, W.1.

Required Lady Tracer for aircraft work, London district. One used to detail.—Reply, stating age, full particulars of qualifications, and salary required, to Box No. 3709, THE AEROPLANE, 166, Piccadilly, W.1.

General Works Inspector, for both wood and metal, required by Government controlled establishment, London area. Direct Government contract. Good salary for good men. No one residing more than 10 miles away or already engaged on Government work need apply.—Apply, with references, to Box No. 3718, THE AEROPLANE, 166, Piccadilly, W.1.

Turners (Centre Lathe Hands) required for aeroplane production; permanency for first class men. Works in open country. Special morning and evening trains from St. Pancras to works, also 'buses. Unlimited canteen accommodation. No one residing more than 10 miles away or already engaged on Government work need apply.—Personal applications or by letter to The Grahame-White Aviation Co., Ltd., The London Aerodrome, Hendon, N.W.9.

Tool Setters for Capstans urgently required for aeroplane production; permanency for first class men. Works in open country. Special morning and evening trains from St. Pancras to works, also 'buses. Unlimited canteen accommodation. No one residing more than 10 miles away or already engaged on Government work need apply. Personal applications or by letter to The Grahame-White Aviation Co., Ltd., The London Aerodrome, Hendon, N.W.9.

Aeroplane Woodworkers urgently required; permanency for first class men. Works in open country. Special morning and evening trains from St. Pancras to works, also 'buses. Unlimited canteen accommodation. No one residing more than 10 miles away or already engaged on Government work need apply.—Personal applications or by letter to The Grahame-White Aviation Co., Ltd., The London Aerodrome, Hendon, N.W.9.

Engine Fitters urgently required for aeroplane erection; permanency for first class men. Works in open country. Special morning and evening trains from St. Pancras to works; also 'buses. Unlimited canteen accommodation. No one residing more than 10 miles away or already engaged on Government work need apply.—Personal applications, or by letter to The Grahame-White Aviation Co., Ltd., The London Aerodrome, Hendon, N.W.9.

Draughtsmen (mechanical). Several first-class draughtsmen required for the Design Department of a large aircraft establishment in West of England. Applicants preferred with practical experience, not necessarily on aircraft. No person already on Government work need apply.—Applications to be made to your nearest Employment Exchange stating salary required and mentioning No.A.5534.

Draughtsman wanted, accustomed to tool design, capable of repetition work, also to have experience with jigs and general production methods. Works few miles north of London. No person already on Government work will be engaged.—Apply to your nearest Employment Exchange, giving age and experience and mentioning No. A.5549.

SITUATIONS WANTED.

Position wanted as jig and tool designer or technical assistant. Twelve years' general engineering and 4 years' aircraft experience. Best references.—Write Box No. 3710. THE AEROPLANE, 166, Piccadilly, W.1.

SITUATIONS WANTED.—continued.

Works Manager, or position of trust, 37, practical engineer, invaluable experience both aeroplanes and seaplanes. Tactful, energetic, methodical organiser, accustomed to latest service methods and capable of economically increasing production.—Box 3284, THE AEROPLANE, 166, Piccadilly, W.1.

Advertiser, 3[illegible] years' practical experience in sheet metal department, fitting, and machine shop. Expert craftsman, open for engagement as works manager; prepared to consider any position where brains, skill, and hard work are essential and appreciated. Must be a firm of repute, building complete machines. London preferred.—Box No. 3651, THE AEROPLANE, 166, Piccadilly, W.1.

Buyer, with wide continental and British aeronautical and automobile commercial experience, desires appointment with financially sound company. Thorough knowledge of all markets, materials, machines, tools, fabric, etc. Substantial range of sub-contractors at command. Keen and proved organiser. Experience includes both sea and land machines. —State salary and particulars, Box No. 3642, THE AEROPLANE, 166, Piccadilly, W.1.

Progress Manager, able to control and organise progress department and distribute work to shops, desires change; 3½ years' experience in well-known firms of up-to-date methods of aircraft production, records, statistics, etc. Must be within 20 miles of London.—Box No. 3679, THE AEROPLANE, 166, Piccadilly, W.1.

Man seeks situation as foreman of woodworking department. Eight years' references general foreman. Low category. Abstainer. Good knowledge of aeroplane construction.—Write, Box No. 3697, THE AEROPLANE, 166, Piccadilly, W.1.

To Aircraft Constructors.—Two expert production engineers require change. Thoroughly conversant with the latest methods of production. Can introduce P.B. system or piecework. Only first-class firms willing to pay good salaries will be considered.—Box No. 3704, THE AEROPLANE, 166, Piccadilly, W.1.

Situation as Foreman or Charge Hand Erector, Fuselages and Finals, many types; speciality production. Keen, energetic, 4 years' sound references.—Box No. 3710, THE AEROPLANE, 166, Piccadilly, W.1.

Experienced, Shop or General Foreman, seeks engagement; manufacturing, assembling or erecting.—Box No. 3715, THE AEROPLANE, 166, Piccadilly, W.1.

Engineer (practical) seeks position as Works Manager, Assistant, or Foreman, machine shop, fitting or tool room; 18 years' sound experience; used to handling mixed labour; 4 years in U.S.A. Live man.—Box No. 3714, THE AEROPLANE, 166, Piccadilly, W.1.

Foreman of Propeller works seeks situation similar, or any woodwork. Good manager of male and female labour, and very successful in training women workers. Good reasons for leaving.—Box No. 3713, THE AEROPLANE, 166, Piccadilly, W.1.

Position required by a skilled man, six years' experience of spares and complete machines. Controlled male and female labour with progressive results. Practical, technical, and administrative knowledge.—State salary to Box No. 3712. THE AEROPLANE, 166, Piccadilly, W.1.

AIRCRAFT PARTS.

Hardwood for Aeroplanes.—Specially Selected air-dried timber as supplied to leading constructors in Britain and the Continent. Silver Spruce, Ash, Poplar; Hickory and Ash Skids; Three-ply; Thin Cedar and Mahogany for Floats; Walnut for Propellers.—William Mallinson and Sons, Ltd., Hackney Road 'Phone, 3845 Central, 4770 Wall.

Tapes, Webs, Cords and Threads in all qualities, suitable for Aircraft Work. Delivery from stock.—John MacLennan and Co., 30, Newgate Street, London, E.C.1. (See Advertisement Page IV of cover and Buyers' Guide).
Cane Seats Immediate delivery. A.G.S.264, other patterns to specification.—Edward A. Day, Elite Works, Basford, Nottingham.
Aeroplane Seats. We can give quick delivery of cane seats, A.G.S. 264, or other patterns, guaranteed pass inspection. Write us for anything required in cane work.—The Willow brook Company, Leicester.
I am open to supply Ash, sawn to dimensions, or bent timber for aircraft or other war work. —Apply, T. M. Gardiner, Hoddesdon, Herts.

FOR SALE.

5,000,000 new bright steel engineers' hexagon bolts, nuts, studs, metal screws available. Send 10s. for parcel of 250 assorted useful sizes, Whitworth, Metric, B.S.F.B.A. threads, guaranteed perfect goods. Sent carriage paid. —Write for full catalogue, Palmer's Garage, Tooting, S.W.
100,000 shop-soiled and second-hand files, 6in.-16in., genuine salvage stock, all guaranteed usable. Send 12s. 6d. for 3 doz. assorted; carriage paid. Approval.—Palmer's Garage, Tooting, S.W.
Overhand Planer, One Thicknessing Machine, and **Fourcutter** for sale.—Box No. 3658, THE AEROPLANE, 166, Piccadilly, W.1.
Airship Seats, completely upholstered or canework only; favourable quotations given and regular deliveries guaranteed.—Frank D. Harrison, Stapleford, Nottingham
A Lot of D.H. and other parts in stock (made in excess of orders) for sale. Cheap.—Apply Box No. 3703, THE AEROPLANE, 166, Piccadilly, W.1.
50-65 Itala Coupe, cream and black. Price, £320, or exchange Rolls or Hispano.—Lt. Ellison, R.A.F., 2A, The Grove, Golder's Green, N.W.4.

WANTED.

Wanted Woodwork for aeroplanes, very large up-to-date factory, fully equipped with latest machines; any class of aircraft work undertaken; prompt deliveries; best work.—Apply Box 3030, THE AEROPLANE, 166, Piccadilly, W.1
Small Engineering Shop as going concern. N.W. district preferred.—Box No. 3717, THE AEROPLANE, 166, Piccadilly, W.1.
Wanted several magnetos for 50 h.p. Gnome engines.—Send particulars and price to the London and Provincial Aviation Co., Stag Lane Aerodrome, Edgware.
Gentleman, founder and for many years managing director of a well-known aircraft firm, desires to look after the London interests of a provincial house, or seeks agencies of good firms. Very capable business man and expert salesman. Has an office in best part of West End. Large remuneration not asked for, advertiser having private means, but the work should be worth advertiser's while.—Box No. 3702, THE AEROPLANE, 166, Piccadilly, W.1.

Strut Sockets, fitting and assembling, also Bench work on aircraft fittings, Copper P[illegible] large and small, also Tube Bending, Braz[illegible] etc. Works in S.W. district, pen to ac[illegible] further contracts calling for accurate work good deliveries.—"Energy," Box 544, S[illegible] Ltd., 168, Fleet Street, E.C.4.
Following Nos. of "Aeroplane":—Vol. No. 12; Vol. 9, No. 3; Vol. 11, Nos. 11, 14-16, 18-21; Vol. 12, Nos. 1-18, 20 22-Vol. 13, No. 26; Vol. 14, Nos. 2-5, 8, 9, 11 All good condition.—Offers to E.H.R., Bez Teignmouth.

MODEL [illegible].

Model Aeroplane, flies [illegible] carriage paid, recommend y[illegible] from Dr. Ad[illegible] Thousands s[illegible] parts.—Dept. Depôt, Eastvi[illegible]
T. W. K. Cl[illegible] partment, Ha[illegible] busy with fu[illegible] we still build [illegible] with Biplanes [illegible] for our illust[illegible] models; certa[illegible]
Model, wate[illegible] motors; clea[illegible] reliable engir[illegible] Works, Little[illegible]

British Scho[illegible] Engineering [illegible] struction; Ae[illegible] Engineering. [illegible] Road, Manch[illegible]

Steam and P[illegible] timber transp[illegible] Ltd., 7, Vic[illegible] Telephone, V[illegible]

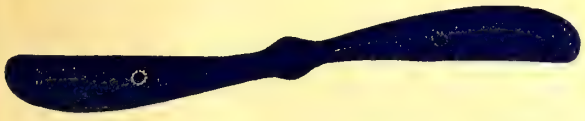
6th Revi[illegible] with "Type[illegible]
THE [illegible]
By CAP[illegible]
Price, [illegible]
McBride Na[illegible]

Just published [illegible]
6¾ *in., limp*
The Aviat[illegible]
By R. [illegible]
Ass[illegible]
Containing da[illegible]
Air Pressure [illegible]
Engines, Typical Aeroplanes, Piloting, [illegible] Meteorological Data, Scouting and Signalling, et[illegible] etc. With Glossary and other information of va[illegible] to all interested in Aviation.
Prospectus on Application.
London: CROSBY LOCKWOOD & SON
7, Stationers' Hall Court, E.C.



CHAUVIÈRE'S

Integral Propellers



are used more extensively than any other Propeller in the World.

Hold all Records and are indisputably the best.

Maximum Efficiency.
Best Workmanship.

THE INTEGRAL PROPELLER CO., LTD.
Edgware Road, The Hyde, Hendon, N.W.9.
Telegrams: "Aviprop, Hyde, London." Telephone: Kingsbury 104.

OXY-ACETYLENE WELDING & CUTTING PLANT

The Latest and Best Type of Plant for this Process as installe by the leading Aircraft, Shipbuilding and Engineering Firms, H. M. Dockyards, etc.

BLOW PIPES AND ALL WELDING ACCESSORIES.
ATOZ FLUXES.

A.C. ATOZ G.B.

Carbide. Flarelights, Handlamps.
Petrol and Oil Storage Drums of any capacity. Steel Barrels, Sheet Metal Work for Aircraft, etc.

The Acetylene Corporation Ltd.
49, VICTORIA ST., WESTMINSTER.
Telegrams: "FLAMMA, VIC, LONDON." Telephone: VICTORIA 4830.

WYCOMBE AIRCRAFT CONSTRUCTORS, LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

Telegrams: Aircraft, High Wycombe.
Telephones - High Wycombe 84.
(Stores - - High Wycombe 120.)

HIGH WYCOMBE.

THE GREEN ENGINE CO., LTD.

:: CONTRACTORS TO ::
H.M. ADMIRALTY
AND WAR OFFICE.

166, PICCADILLY, W.1.

Telegrams: "*Airengine, London*" *Telephones: Gerrara* 8165; *Richmond* 1293.



EDITORIAL AND ADVERTISEMENT OFFICES, 166, PICCADILLY, W 1.

Printed for The Aeroplane and General Publishing Co., Ltd., by Bonner & Co., The Chancery Lane Press, Rolls Passage, London; and Published by The Rolls House Publishing Company, Ltd., at Rolls House, Breams Buildings, London.

SMITHSONIAN INSTITUTION LIBRARIES


SMITHSONIAN INSTITUTION LIBRARIES

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 00944 2682